Afrotropical jumping plant lice of the family Triozidae (Homoptera: Psylloidea)

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Synopsis

The family Triozidae is defined within the context of the superfamily Psylloidea. A list is given of the genera included in the family, on a world basis, with type-species and a summary of numbers of species, their distribution and host plant data. The family-group name Pauropsyllinae is placed within the Triozidae, necessitating the transfer of *Paurocephala* back to the Aphalaridae and *Microceropsylla* and *Pelmatobrachia* to the Calophyidae, and seven new combinations. The genus-group name *Sympauropsylla* is synonymised with *Pauropsylla*. A checklist of Afrotropical taxa is given, with host plant and distribution data, and a key is provided for the identification of the 69 recognisable species. Two of the eight previously described species are treated as doubtful because their types are lost or untraced and the species cannot be recognised from their original descriptions; *Trioza eastopi* Orian is synonymised with *T. litseae* Bordage; one new genus and 63 new species are described.

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Introduction

Throughout the world, species of the family Triozidae display a wide range of body form and host plant preferences. Currently 48 genera are recognised but many of these are poorly defined and have no clear diagnostic features. Members of the family may be recognised easily, in the adult stage, by the unique venation and structure of the forewing (pp. 8–10, and Figs 40, 43). Fifth instar larvae of most species are also characteristic as the head and body margins normally have a complete fringe of specialised wax-producing setae called sectasetae (Figs 280, 289, 315). Table 1 gives, for each genus of Triozidae, a summary of the type-species, numbers of species included, distribution and host plant preferences.

Table 1 Genera of Triozidae with type-species, numbers of species, distribution and host plant data. Numbers of species recorded in parenthesis under one zoogeographical region also occur in another region. For the purposes of this table species previously included under the generic names *Megatrioza, Heterotrioza* and *Smirnovia* are here included under *Trioza*. (*Heterotrioza* Dobreanu & Manolache, 1962: 258; type-species *Trioza obliqua* Thomson. *Megatrioza* Crawford, 1915: 264; type-species *M. armata* Crawford. *Smirnovia* Klimaszewski, 1968: 13; type-species *Trioza femoralis* Foerster.)

Genus	Type-species	Distribution								Numbers of species	Host plant families
		Palaearctic	Afrotropical	Oriental	Australo-Oriental	Australasian	Polynesian	Nearctic	Neotropical		
Aacanthocnema Tuthill & Taylor, 1955: 252	*Trioza casuarina* Froggatt, original designation					3				3	Casuarinaceae, Proteaceae, Myrtaceae
Anomocephala Tuthill, 1943: 75	*Anomocelphala unica* Tuthill, original designation						1			1	unknown
Bactericera Puton, 1876: 286	*Bactericera perrisii* Puton, by monotypy	5								5	Compositae (one on *Allium*)
Calinda Blanchard, 1852: 309	Type-species not designated								8	8	unknown
Cecidotrioza Kieffer, 1908: 159	*Cecidotrioza baccarum* Kieffer, by monotypy			2					1	3	Symplocaceae, Compositae
Ceropsylla Riley, 1885: 76	*Ceropsylla sideroxyli* Riley, by monotypy			3				1	4 + (1)	8	various
Cerotrioza Crawford, 1918: 454	*Cerotrioza bivittata* Crawford, original designation				1		2			3	Flacourtaceae
Crawforda Caldwell, 1940: 397	*Crawforda triopsyllina* Caldwell, original designation						1			1	Araliaceae
Dasymastix Enderlein, 1921: 122	*Trioza gigantea* Crawford, original designation			1						1	unknown
Egeirotrioza Boselli, 1931: 268	*Trioza ceardi* de Bergevin, original designation	11								11	Salicaceae (*Populus*)
Engytatoneura Loginova, 1972*b*: 33	*Engytatoneura lindbergi* Loginova, original designation	1								1	unknown
Epitrioza Kuwayama, 1910: 55	*Epitrioza mizuhonica* Kuwayama, original designation	11								11	Eleagnaceae
Eryngiofaga Klimaszewski, 1968: 10	*Trioza mesomela* Flor, original designation	13								13	Umbelliferae
Eutrioza Loginova 1964: 473	*Eutrioza opima* Loginova, by monotypy	1								1	unknown
Hemischizocranium Tuthill, 1956: 158	*Hemischizocranium bessi* Tuthill, original designation						2			2	Rutaceae
Hemitrioza Crawford, 1914: 104	*Hemitrioza sonchi* Crawford, original designation							1		1	Compositae
Hevaheva Kirkaldy, 1902: 113	*Hevaheva perkinsi* Kirdkaldy, by monotypy						8			8	Rutaceae, Xanthophyllaceae
Izpania Klimaszewski, 1962: 254	*Izpania acona* Klimaszewski, original designation								1	1	unknown
Kuwayama Crawford, 1911: 503	*Paratrioza medicaginis* Crawford, original designation						5	1 + (1)	11	17	various
Leptotrioza Miyatake, 1972: 29	*Neotriozella bicolor* Crawford, original designation				1					1	? Annonaceae

Genus	Type-species	Distribution								Numbers of species	Host plant families
		Palaearctic	Afrotropical	Oriental	Australo-Oriental	Australasian	Polynesian	Nearctic	Neotropical		
Leptynoptera Crawford, 1919: 147	*Leptynoptera sulfurea* Crawford, original designation			(1)	1 + (1)		1 + (1)			2	Guttiferae (*Calophyllum*)
Leuronota Crawford, 1914: 67	*Trioza maculata* Crawford, original designation			1	3		1	2	6 + (1)	13	various
Levidea Tuthill, 1938: 245	*Levidea lineata* Tuthill, original designation							1		1	Compositae
Metatrioza Tuthill, 1939: 53	*Metatrioza pubescens* Tuthill, original designation							2		2	unknown
Myrmecephala Tuthill, 1945: 22	*Myrmecephala prima* Tuthill, original designation								2	2	unknown
Neolithus Scott, 1882*a*: 445	*Neolithus fasciatus* Scott, by monotypy								1	1	Euphorbiaceae (*Sapium*)
Neotrioza Kieffer, 1905: 175	*Neotrioza machili* Kieffer, by monotypy			1					1	2	Lauraceae
Neotriozella Crawford, 1911: 503	*Trioza immaculata* Crawford, original designation							4		4	? Rosaceae
Optomopsylla Caldwell, 1944: 338	*Optomopsylla formiciformis* Caldwell, original designation								1	1	? Salicaceae
Ozotrioza Kieffer, 1905: 178	Type-species not designated			2						2	Styracaceae, Lauraceae
Paracomeca Laing, 1923: 702	*Paracomeca fuscata* Laing, original designation								1	1	? Ulmaceae
Paratrioza Crawford, 1910: 228	*Paratrioza ocellata* Crawford, subsequent designation by Crawford, 1911: 446	4						6	(2)	10	Mainly Solanaceae
Pariaconus Enderlein, 1926: 401	*Kuwayama nigricapita* [as *nigricapatus*] Crawford, original designation						1			1	Myrtaceae
Pauropsylla Rübsaamen, 1899: 262	*Pauropsylla udei* Rübsaamen, by monotypy	2	13	5	2 + (1)					22	Moraceae (*Ficus*), ? Rubiaceae
Paurotriozana Caldwell, 1940: 396	*Paurotriozana adaptata* Caldwell, original designation						1			1	Lauraceae
Petalolyma Scott, 1882b: 359	*Psylla basalis* Walker, by monotypy			1						1	Fagaceae
Pseudotrioza Miyatake, 1972: 27	*Pseudotrioza hiurai* Miyatake, original designation				1					1	Anacardiaceae
Rhegmoza Enderlein, 1918: 480	*Rhegmoza tinctoria* Enderlein, original designation								1	1	unknown
Rhinopsylla Riley, 1885: 77	*Rhinopsylla schwarzii* Riley, by monotypy	1		2	1			4	(1)	8	unknown
Schedoneolithus Tuthill, 1959: 26	*Schedoneolithus dunaliae* Tuthill, original designation								1	1	Solanaceae
Schedotrioza Tuthill & Taylor, 1955: 251	*Trioza eucalypti* Froggatt, original designation					4				4	Myrtaceae
Stenopsylla Kuwayama, 1910: 53	*Stenopsylla nigricornis* Kuwayama, original designation			2	3					5	Symplocaceae, Myrsinaceae, Ericaceae
Swezeyana Caldwell, 1940: 389	*Swezeyana elongagena* Caldwell, original designation						2			2	Sapotaceae
Trichochermes Kirkaldy, 1904: 280	*Trioza walkeri* Foerster, by monotypy	4	1	2						7	Mainly Rhamnaceae
Trioza Foerster, 1848: 82	*Chermes urticae* Linnaeus, by subsequent designation, Oshanin, 1912: 128	133	53	24 + (3)	28 + (2)	3	61 + (2)	43 + (3)	44 + (9)	389	various
Triozamia Vondracek, 1963: 266	*Rhinopsylla lamborni* Newstead, original designation		3							3	Moraceae (*Antiaris*)
Triozoida Crawford, 1911: 491	*Triozoida johnsonii* Crawford, original designation								5	5	various
Afrotrioza gen. n.	*Afrotrioza bersama* sp. n., here designated		1							1	Melianthaceae
Numbers of species		186	71	46	41	10	86	65	88	593	

Like most Psylloidea, triozid species have very restricted trophic requirements, at least in their larval stages. They are associated with dicotyledonous plants, and the host range of triozids, as a whole, is greater than any other family of psyllids. It is worthy of note that the family does not colonise the Fabaceae (= Leguminosae), a plant family greatly exploited by the Arytaininae/Euphalerinae complex of the Psyllidae. Two *Trioza* species in New Zealand, *T. colorata* (Ferris & Klyver) and *T. dacrydii* Tuthill, are known to develop on *Dacrydium*, a gymnosperm (Podocarpaceae); and one species in Hawaii, *Megatrioza palmicola* Crawford, develops on *Pritchardia* spp. (Palmae). One Palaearctic species, *Trioza nigricornis* Foerster, is apparently polyphagous and has been recorded from *Brassica* (Cruciferae), *Daucus* (Apiaceae), *Solanum* (Solanaceae) and *Beta* (Chenopodiaceae), but recent work (Hodkinson, 1981) suggests a species complex may be involved.

Several other triozid species are associated with plants of economic importance. *Trioza alacris* Flor causes leaf-rolling in bay laurel (*Laurus nobilis*, Lauraceae) and has been introduced to various parts of the world, along with its host plant. In the New World *Paratrioza cockerelli* (Sulc) causes 'psyllid yellows' on potato (*Solanum tuberosum*, Solanaceae); *T. anceps* Tuthill, *T. magnoliae* Ashmead and *T. perseae* Tuthill feed on avocado pear (*Persea americana*, Lauraceae) in Central and South America. In the Oriental Region *Trioza vitiensis* Kirkaldy causes gall formation on the leaves of Malay apple (*Eugenia malaccensis*, Myrtaceae), and *T. cinnamomi* (Boselli) larvae form pit-galls on the leaves of *Cinnamomum* spp. (Lauraceae). In North Africa and the eastern Mediterranean basin *Pauropsylla willcocksi* Dçbski causes pit-gall formation on the leaves of fig trees (*Ficus sycomorus*, Moraceae). *T. litseae* Bordage develops on *Litsea glutinosa* (Lauraceae) and feeds as an adult on *Vanilla planifolia* (Orchidaceae) on Réunion and Mauritius, and *T. erytreae* (Del Guercio) is a serious pest of citrus (Rutaceae) in eastern and southern Africa where it is the principal vector of 'citrus greening disease'.

Because of its pest status, *T. erytreae* has received considerable attention from biologists. Information on its life-cycle, bionomics, control, and further references may be found in Catling (1969*a*; 1969*b*; 1969*c*; 1970; 1971; 1972; 1973); Moran (1968*a*; 1968*b*); Moran & Blowers (1967); Moran & Brown (1973); and Moran & Buchan (1975). This species is of considerable taxonomic interest as it is part of a complex of species, all of which are difficult to define morphologically, but which have discrete host plant preferences (see pp. 36–42).

Five other triozid species are recorded from the Afrotropical Region and the present paper adds a further 63 hitherto undescribed species to this list. A species and host plant checklist is given below.

Checklist, host plants and distribution of Afrotropical Triozidae

SPECIES	HOST PLANTS		DISTRIBUTION
	family	species	
***Afrotrioza bersama* sp. n.**	Melianthaceae	*Bersama* sp.	Tanzania
***Pauropsylla angolensis* sp. n.**		Not known	Angola
***P. breviantennata* sp. n.**		Not known	Ghana, Nigeria
***P. eastopi* sp. n.**		Not known	Cameroun
***P. longipes* sp. n.**	Moraceae	*Ficus* sp.	Ghana, Nigeria, Cameroun, Tanzania
***P. mistura* sp. n.**		Not known	Ghana, Nigeria, Cameroun
***P. ngongae* sp. n.**		Not known	Kenya
***P. proxima* sp. n.**	Moraceae	*Ficus thonningii* Blume; *Ficus* sp.	Nigeria, Cameroun, Angola

SPECIES	HOST PLANTS		DISTRIBUTION
	family	species	
***P. senegalensis* sp. n.**	Moraceae	*Ficus* sp.	Senegal
***P. septima* sp. n.**		Not known	Cameroun
***P. tatrichea* sp. n.**		Not known	Ivory Coast, Cameroun
***P. trichaeta* Pettey**	Moraceae	*Ficus sur* Forskål; *Ficus* sp.	Pan-African
***P. trigemma* sp. n.**		Not known	Angola, Tanzania
***P. willcocksi* Dçbski**	Moraceae	*Ficus sycomorus* Linn.; *F. gnaphalocarpa* A. Rich; *Ficus* sp.	Cape Verde Is., Senegal, Sudan, Egypt, Saudi Arabia
***Trichochermes insleyi* Capener**	Rhamnaceae	*Ziziphus mucronata* Willd.	South Africa (Transvaal)
***Trioza afrobsoleta* sp. n.**	Ebenaceae	*Diospyros mespiliformis* Hochst. ex A. DC	Ivory Coast, Ghana, Nigeria, Sudan, Angola, Tanzania
***T. afrosersalisia* sp. n.**	Sapotaceae	*Afrosersalisia* sp.	Tanzania, South Africa (Cape Province)
***T. anomalicornis* sp. n.**		Not known	Nigeria, Cameroun
***T. ata* sp. n.**	Salicaceae	*Salix safsaf* Forssk.	Angola, Tanzania
***T. bamendae* sp. n.**		Not known	Cameroun
***T. boxi* sp. n.**	Ebenaceae	*Diospyros canaliculata* De Wild	Ghana
***T. bussei* Zacher**	?Apocynaceae	*Kickxia* sp.	Cameroun
***T. camerounensis* sp. n.**		Not known	Cameroun
***T. capeneri* sp. n.**	Araliaceae	*Seemannaralia gerrardii* (Seeman.) Vig.	South Africa (Natal)
***T. capensis* sp. n.**	Solanaceae	*Lycium salinicola* Verdoorn; *L. ?tetrandrum* Thunb.	South Africa (Cape Province and Orange Free State)
***T. carvalhoi* sp. n.**	Araliaceae	*Cussonia angolensis* Hiern; *C. paniculata* Ecklon.; *C. spicata* Thunb. & Zeyher	Kenya, Angola, South Africa (Transvaal and Natal), Swaziland
***T. catlingi* sp. n.**	Menispermaceae	*Cissampelos torulosa* E. Mey. ex Harv. & Sond.; *Cissampelos* sp.; *Stephania abyssinica* (Dill. & Rich.) Walp	Kenya, Tanzania, South Africa (Transvaal)
***T. chiangae* sp. n.**	Uapacaceae	*Uapaca nitida* Muell. Arg.	Angola
***T. dinaba* sp. n.**		Not known	Ghana, Nigeria
***T. eafra* sp. n.**	Araliaceae	*Cussonia spicata* Thunb.	Kenya, Tanzania
***T. erytreae* (Del Guercio)**	Rutaceae	*Clausena anisata* (Willd.) Oliv.; *Citrus* spp.; *Fagara*	Tropical and South Africa, São Tomé, St Helena,

SPECIES	HOST PLANTS		DISTRIBUTION
	family	species	
		capensis Thunb.; *Vepris undulata* (Thunb.) Verdoorn & C. A. Smith	Réunion, Madagascar
***T. etiennei* sp. n.**	Sapotaceae	*Malacantha alnifolia* (Baker) Pierre	Senegal, Ghana, Nigeria
***T. ficicola* sp. n.**	Moraceae	*Ficus* sp.	Mozambique
***T. fuscivena* sp. n.**		Not known	Cameroun
***T. ghanaensis* sp. n.**	Sapotaceae	*Malacantha* sp.	Ghana, Zaire
***T. glabea* sp. n.**		Not known	Angola
***T. gonjae* sp. n.**	Ebenaceae	*Diospyros squarrosus* Klotzch	Tanzania
***T. gregoryi* sp. n.**		Not known	Nigeria, Burundi, Tanzania
***T. guiera* sp. n.**	Combretaceae	*Guiera senegalensis* J. F. Gmel.	Senegal, Gambia, Chad, Sudan
***T. hargreavesi* sp. n.**		Not known	Nigeria, Uganda
***T. harteni* sp. n.**	Uapacaceae	*Uapaca nitida* Muell. Agr.	Angola
***T. kakamegae* sp. n.**	Icacinaceae	*Apodytes dimidiata* E. Mey.	Kenya
***T. karroo* sp. n.**		Not known	South Africa (Cape Province)
***T. kilimanjarica* sp. n.**		Not known	Tanzania
***T. laingi* sp. n.**	?Scrophulariaceae	*?Bartsia longiflora* Benth.	Ethiopia, Kenya
T. litseae Bordage	Lauraceae	*Litsea glutinosa* (Lour.) C. B. Rob.	Réunion, Mauritius
***T. luvandata* sp. n.**		Not known	Angola
***T. medleri* sp. n.**		Not known	Nigeria, ?Zaire
***T. menispermicola* sp. n.**	Menispermaceae	*Cissampelos owariensis* P. Beauv. ex A. DC; *Triclisia macrophylla* Oliv.; *T. patens* Oliv.	Ghana, Nigeria
***T. messaratina* sp. n.**		Not known	Tanzania
***T. mimusops* sp. n.**	Sapotaceae	*Mimusops caffra* E. Mey. ex A. DC; *M. obovata* Sonder; *M. zeyheri* Sonder	South Africa (Transvaal, Natal, Cape Province)
***T. mirificornis* sp. n.**		Not known	Cameroun, Uganda
***T. nachingweae* sp. n.**		Not known	Tanzania
***T. neoboutonia* sp. n.**	Euphorbiaceae	*Neoboutonia* sp.	Tanzania

SPECIES	HOST PLANTS		DISTRIBUTION
	family	species	
***T. nestasimara* sp. n.**		Not known	Tanzania
***T. pitkini* sp. n.**	Sapotaceae	*Chrysophyllum viridifolium* Wood & Franks or *C. pruiniforme* Engl.	Kenya
***T. schroederi* sp. n.**		Not known	Tanzania, Zimbabwe
***T. seranistama* sp. n.**		Not known	Tanzania
T. similis Heslop-Harrison		Not known	South Africa (Cape Province)
***T. tangae* sp. n.**		Not known	Tanzania
***T. tavandula* sp. n.**		Not known	Angola
***T. tenuis* sp. n.**	Sapindaceae	*Haplocoelum foliolosum* (Hiern) Bullock	Angola
***T. theroni* sp. n.**		Not known	South Africa (Natal, Cape Province)
***T. thibae* sp. n.**	Icacinaceae	*Apodytes dimidiata* E. Mey.	Kenya
***T. tiliacora* sp. n.**	Menispermaceae	*Tiliacora* sp.	Tanzania
***T. tundavalae* sp. n.**	Myrtaceae	*Syzygium benguellense* (Welw. ex Hiern)	Angola
***T. usambarica* sp. n.**		Not known	Tanzania
***T. xylopia* sp. n.**	Annonaceae	*Xylopia* sp.	Tanzania
Triozamia lamborni (Newstead)	Moraceae	*Antiaris toxicaria* Lesch. subsp. *africana* (Engl.) C. C. Berg var. *africana*	Senegal, Ivory Coast, Ghana, Nigeria, Zaire, Tanzania
***T. usambarensis* sp. n.**	Moraceae	*Antiaris toxicaria* Lesch. subsp. *africana* (Engl.) C. C. Berg var. *usambarensis* (Engl.) C. C. Berg	Tanzania
***T. vondraceki* sp. n.**	Moraceae	*Antiaris toxicaria* Lesch. subsp. *africana* (Engl.) C. C. Berg var.?	Central African Republic, Uganda

Material, methods and terminology

The bulk of the material studied is deposited in the British Museum (Natural History) (BMNH), with additional material from the Museum für Naturkunde der Humboldt Universität, Berlin (MNHU); Musée Royal de l'Afrique Centrale, Tervuren (MRAC); and the [National Collection of Insects] Plant Protection Research Institute, Pretoria (NCI). Holotypes and paratypes of the species treated below are deposited in BMNH, MNHU, NCI, Muséum National d'Histoire Naturelle, Paris (MNHN); the National Museums of Kenya (NMK); South African Museum, Cape Town (SAM); and the National Museum of Natural History, Washington (USNM).

All measurements are quoted in millimetres and were taken from slide-mounted material. Reference points, within which measurements were taken of the various structures, are given in Hollis (1976), with additional information in Fig. 43. The length of the antennal flagellum is a summation of the lengths of individual flagellomeres.

Unless otherwise stated all figures were drawn from slide-mounted material; scale lines represent 0·1 mm unless labelled otherwise. On the forewing figures the outer limits of patches of spinules are indicated by pecked lines, as is the claval suture. Each paramere figure shows the inner surface of the right paramere. The figures of the larvae show the dorsal surface outline, left side only; details are shown of the marginal setae, representing 0.1 mm, of the head, forewing bud and caudal plate. The detail of the anal pore area is shown from a ventral view, right side only.

Structural terminology follows that of Vondráček (1957) and Hollis (1976). Wing venation terminology is explained in Figs 40, 43. The m_1 cell value is an expression of shape calculated by dividing the length of M_{1+2} by the distance between the apices of M_{1+2} and M_{3+4}. Similarly the cu_1 cell value is the distance between the apices of Cu_{1a} and Cu_{1b} divided by the length of Cu_{1b}. The Rs–Cu_{1a} line is an imaginary line connecting the apices of Rs and Cu_{1a}.

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TRIOZIDAE Löw

Triozinae Löw, 1879: 605, 609; Maskell, 1890: 164; Froggatt, 1901: 272; Crawford, 1914: 64; 1919: 184; Pflugfelder, 1941: 78; Tuthill, 1943: 545; 1944: 144; 1952: 97; Zimmermann, 1948: 14; Heslop-Harrison, 1958: 562; 1961: 529; Ramirez-Gomez, 1960: 15; Mathur, 1975: 299. Type-genus: *Trioza* Foerster.

Triozina Löw; Löw, 1886: 163.

Triozaria Löw; Puton, 1886: 93.

Triozidae Löw; Edwards, 1896: 251; Vondráček, 1957: 297; Dobreanu & Manolache, 1962: 253; Loginova, 1964: 473; Klimaszewski, 1973: 231; 1975: 201; Bekker-Migdisova, 1973: 113.

Siphonaleyrodinae Takahashi, 1932: 48. Type-genus: *Siphonaleyrodes* Takahashi. [Synonymised by Mound & Halsey, 1978: 252.]

Differentiating diagnosis. Forewing (Fig. 40) without a costal break; R_1 unbranched and pterostigma absent; $M+Cu$ stem absent or very short so that $R+M+Cu$ stem branches into its component veins at approximately one point; R_s not fused to M stem at any point.

Comments. This suite of characters separates the Triozidae from all other psyllid groups and I regard it as autapomorphic for the family. Furthermore I believe the morphology of the triozid forewing has evolved to produce a wing movement which is fundamentally different to that of other psyllids: there being no nodal line, from the costal break through to the break on the hind margin at the apex of the claval suture, for the wing to flex.

Many other groups of psyllids have some, but not all, of the triozid wing features. The costal break is lost in the Macrohomotomini, the Carsidarini and many members of the Arytainini; in *Epipsylla* the pterostigma is lost; and in many members of the Calophyidae $M+Cu$ stem is reduced. In the Central and South American genus *Synoza* the triozid wing condition is achieved in an entirely different way. Rs is fused to M stem along its proximal two-thirds, the costal break is absent but $C+Sc$ is only very weakly sclerotised in the break area. The venation of this genus can be derived easily from that of some South East Asian members of the Homotominae to which *Synoza* is most closely related.

As yet I have been unable to find synapomorphies linking the Triozidae with any one other group of psyllids to the exclusion of all others. Therefore I am regarding the rest of the Psylloidea as a paraphyletic group with respect to the Triozidae.

The systematic scope of the Triozidae, as considered here, is similar to that of most recent authors but with the addition of the genera *Pauropsylla* and *Leptynoptera*. This is a relatively radical change as all previous authors, apart from White (1980), regarded *Pauropsylla* as a member of the Pauropsyllinae (or Pauropsyllini) within either the Carsidaridae or the Aphalaridae (see p. 27).

Some attempt has been made by previous authors to provide a subfamilial or tribal classification for the Triozidae. Vondráček (1963) placed *Triozamia* in the Bactericerinae but retained the subfamily within the Ciriacreminidae (sensu Heslop-Harrison, 1958; nec Hollis, 1976). Klimaszewski (1964: fig. 7) divided the group into two subfamilies, the Bactericerinae and the Triozinae. Bekker-Migdisova (1973) retained these two subfamilies and divided the Bactericerinae into two tribes, the monotypic Triozamini (*Triozamia*) and the Bactericerini (*Bactericera, Rhinopsylla, Levidea* and one unnamed genus). She divided the Triozinae into the Hemischizocraniini (*Hemischizocranium*), the Paracomecini (*Paracomeca*) and the Eutriozini (*Eutrioza*). Presumably she regarded the remaining 40 or so genera as members of a fourth tribe, the Triozini. Kwon (1983), in a review of the Korean psyllid fauna, erected the monobasic tribes Epitriozini (*Epitrioza*) and Trichochermini (*Trichochermes*), apparently without reference to the remaining world fauna.

Most of the 47 previously described triozid genera are poorly defined and often based on inadequate or primitive characters. Species have been added to various genera without comparison with relevant type-species, thus stretching generic limits beyond usefulness and logic. The resulting network of genera is impossible to unravel without an overall examination of original material. No attempt is made here to 'fit' species into existing genera other than *Trioza*, only one new genus is erected and the bulk of the Afrotropical species are placed in *Trioza* on a temporary basis. Where species-groups are recognisable these are defined, and if relationships with the triozid fauna outside Africa are apparent then these are noted.

The characters used to differentiate taxa in this paper are discussed, together with their likely polarity. When other faunas are examined in the light of these, and probably other characters not considered here, we may be able to produce a reasonably natural and predictive higher classification for the Triozidae and offer useful biogeographical comment on the group.

Characters and their polarity

The *integument* has a general covering of setae of varying density which can be of use in distinguishing between closely related species. Often the density of pilosity on the vertex and thoracic dorsum is different to that of the genal cones and legs. Illustrations of dense, sparse, long and short pilosity are given in Figs 35, 38, 39.

The *head*, in its primitive condition, is adpressed to the thorax and not declined from the longitudinal axis of the body (Figs 32, 33). The occipital margin is sharply defined, the median suture of the vertex is well developed and the median ocellus is visible from above. Frontal lobes on the vertex tend to be better developed in the primitive head condition. Genal cones are normally well developed in the group and cover the frons. Generally, in psyllids, it is thought that the absence of genal cones is a primitive condition but their absence may be a reversal in Triozidae. The more derived head condition shows it declined towards 90° from the longitudinal axis of the body (Fig. 34), with a rounded occipital margin. The vertex becomes rounded downwards and lacks frontal lobes. In some species, especially in the genus *Pauropsylla*, the median suture of the vertex is lost.

The *antenna* (Figs 9–29) shows many useful characters. In the primitive condition it has a scape, pedicel and a flagellum which has eight flagellomeres, with a single rhinarium present subapically on each of flagellomeres 2, 4, 6 and 7. Several species have developed supplementary rhinaria, particularly on the first flagellomere (*Triozamia lamborni, Trioza theroni* and the *T. hargreavesi*-group). I suspect this feature is not uniquely derived. The rhinaria are normally

disc-shaped, with a convex centre, but may have complicated associated sensilla (Figs 22–28). Flagellomere 8 bears two terminal setae, which are subequal in length in the primitive condition. Throughout the group there is a tendency for one of the pair to become shortened and truncate apically, and this condition reaches its greatest development in *Trioza anomalicornis* where one of the setae is reduced to a flat, circular sense organ (Fig. 17). The overall length of the flagellum compared to head width is of use in distinguishing between species, and the relative lengths of individual flagellomeres can also be useful. Reduction in the number of flagellomeres is rare but does occur in some *Pauropsylla* species, with 3 and 5, which do not normally bear rhinaria, being lost.

The *mouthparts* are relatively standard throughout the group. The clypeus most commonly has a pair of setae but in some species, notably those displaying primitive character states, several setae are present (Figs 5, 7). The ultimate rostral segment always bears a pair of basal setae and one or more pairs of setae along its length. It is rarely devoid of setae supplementary to the basal pair (Figs 6, 8).

The *thorax*, in the primitive state, is relatively flat, the pronotum is clearly visible from above and rounded down anteriorly behind the occiput (Figs 30, 31). The propleural suture is diagonal, with the episternum somewhat larger than the epimeron, but the latter is in contact with the posterolateral corner of the pronotum. The mesopraescutum is wider than long, with a broadly arcuate anterior margin which is gently rounded down to the pronotum. In the derived state the pronotum becomes strongly rounded down behind the occiput and is scarcely visible from above. The episternum becomes greatly enlarged and its posterior margin expanded laterally and curved forward behind the eye; the epimeron being reduced and displaced ventrally. The mesopraescutum is elongated and produced forward, with a strongly arcuate anterior margin which is strongly rounded or angled down to the pronotum (Figs 36, 37).

The *forewing* displays a number of distinct trends. The general shape varies from being ovate with a rounded apex to elongate oval with an angular apex, but the obovate condition in *Pauropsylla* is probably secondarily derived. The membrane may be heavily spinuled (Fig. 241) through to being devoid of spinules apart from the radular areas. The latter are normally present at the margin of the wing in cells m_1, m_2 and cu_1, although more primitively they also occur in r_2 (Fig. 65). They may be diffuse and broad or sharply defined and narrow triangular (Figs 249, 178). The wing veins are usually sparsely clothed with short setae (Fig. 126) but may bear long setae (Figs 183, 254); the latter condition is not always associated with a dense pilosity on the integument. In the most primitive form of venation (Fig. 268) *Rs* is long, *M* branches proximally to the Rs–Cu_{1a} line (see p. 16) with a consequently high m_1 cell value, *Cu* is short with a consequently low cu_1 cell value, and the claval suture reaches the wing margin close to the distal apex of Cu_{1b}. In the most derived condition (Fig. 126) *Rs* is short, *M* branches distal to the Rs–Cu_{1a} line with a consequently low m_1 cell value, *Cu* is long with a consequently high cu_1 cell value and the claval suture reaches the hind margin distant from the apex of Cu_{1b} and more proximal to the base of the wing. These trends are not always associated and there are many combinations.

The *hindwing*, in the primitive state, is two-thirds or more as long as the forewing. The costal margin is more densely setose, with the setae distal to the costal break not clearly divided into two groups (Fig. 44). In the derived state the hindwing is much shorter than the forewing and, in the *Trioza obsoleta* group, it can be completely reduced and scale-like (Figs 179, 184, 189). Reduction in length is congruent with the displacement of the apex of the claval suture of the forewing towards the base of the wing. The costal margin is sparsely setose, with the setae distal to the costal break clearly divided into two groups (Fig. 42).

The *fore* and *mid legs* offer few characters of taxonomic significance, although the *Pauropsylla willcocksi*-group has the extraordinary development of a ventroapical spur on the fore coxa (Fig. 45). One or other of the tarsal segments may be elongated.

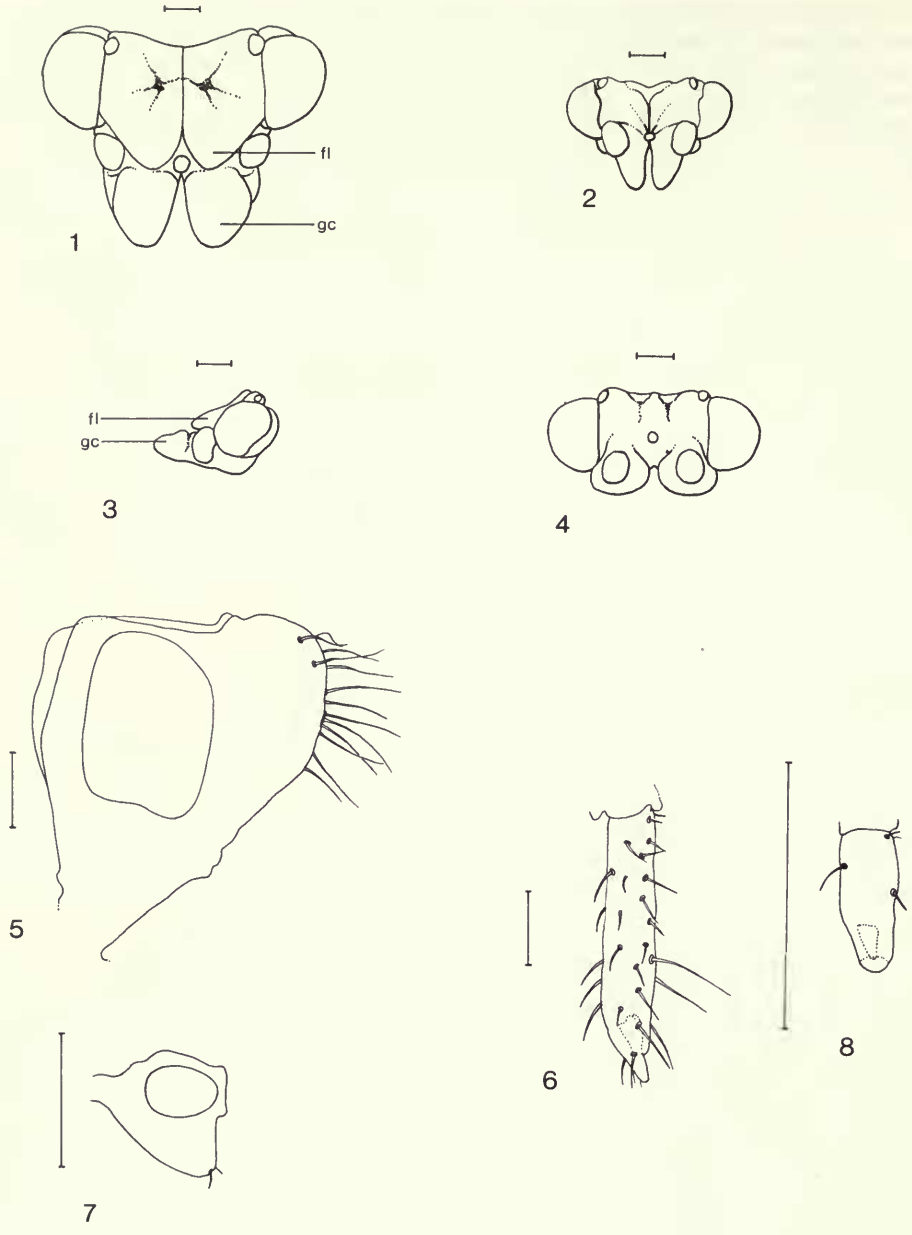
The *hind leg* bears several useful characters. The coxa usually bears a well-developed meracanthus, although this is weak in *Triozamia lamborni* and in the *Trioza etiennei*-group, and there is often an anterior lobe developed (Figs 46, 47). The latter structure has, in the past, been

used to group species but the feature has probably evolved several times. The three ventral sense organs on the femur, which are probably stretch receptors, are usually in a medial position (Fig. 49) but in *Triozamia lamborni* they are in the more primitive basal position (Fig. 48). The tibia has a basal spine or tubercle, or a raised area bearing one or more small spines. The presence of a large basal spine has been used in generic diagnoses, but I consider this to be the primitive state. Apical tibial spurs (Figs 52, 53) are normally present and are divided into an outer group of one spur and an inner group of up to four spurs. In *Triozamia lamborni* the outer spur is lost and the inner group consists of up to five spurs. There is a tendency towards reduction of the number of inner spurs and there can be some variation within a species, e.g. some species which normally have three inner spurs occasionally have only two on one or other leg. Few species have these spurs completely lacking but again I think this is a feature which has arisen more than once. Spurs at the apex of the basitarsus, a common feature in the rest of the Psylloidea, are, with the exception of *Afrotrioza*, absent in the family.

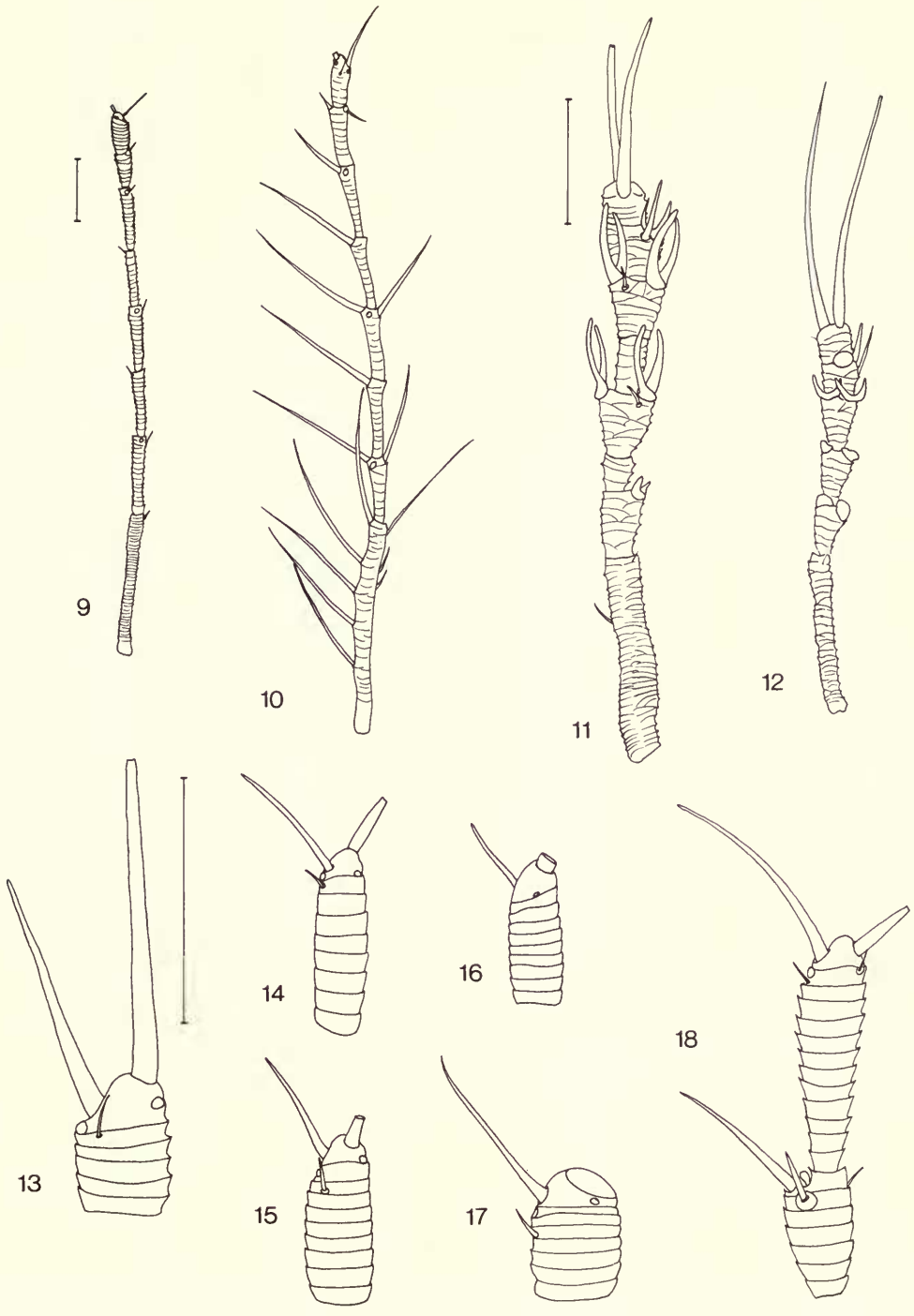
The *abdomen*, in psyllids generally, has setae on all visible abdominal tergites but this condition occurs in very few triozids (four species in the Afrotropical Region). The usual condition in this family is for setae to be present only on the first, or the first two, visible tergites, i.e. tergites 2 and 3 in males and 3 and 4 in females. *Trichochermes insleyi*, some of the *Trioza obsoleta*-group and *T. guiera*, have setae on all tergites except the pregenital; *T. mimusops* has setae only on tergites 6 to 8; *T. chiangae* has setae on tergites 3 to 5; and the abdominal tergites of *T. afrosersalisia* are apparently devoid of setae. This character is not directly associated with general body pilosity because *T. medleri*, probably the most setose Afrotropical species, has only the first visible abdominal tergite setose.

The *male genitalia* provides the most useful character suite for defining species. As in most psyllids, the proctiger is normally unsegmented (unipartite), but a bipartite proctiger occurs in *Triozamia* species and is almost developed in the *Trioza etiennei*-group. I consider a bipartite proctiger to be the derived condition (Fig. 59). The unipartite proctiger can be a simple, almost cylindrical tube (Fig. 242) but more commonly the basal part is swollen and often bears lateral expansions which sometimes have modified setae on their inner surfaces (Figs 76, 97, 135). The shape of the paramere and its chaetotaxy is usually definitive for a species. The aedeagus is composed of two articulated segments, as in most psyllids, but the apical segment is subdivided into two parts in *Triozamia lamborni* and in the *Trioza etiennei*-group (Figs 64, 200). The apical part of the aedeagus is usually definitive for each species, and in some cases is quite complex (Figs 88, 91, 136).

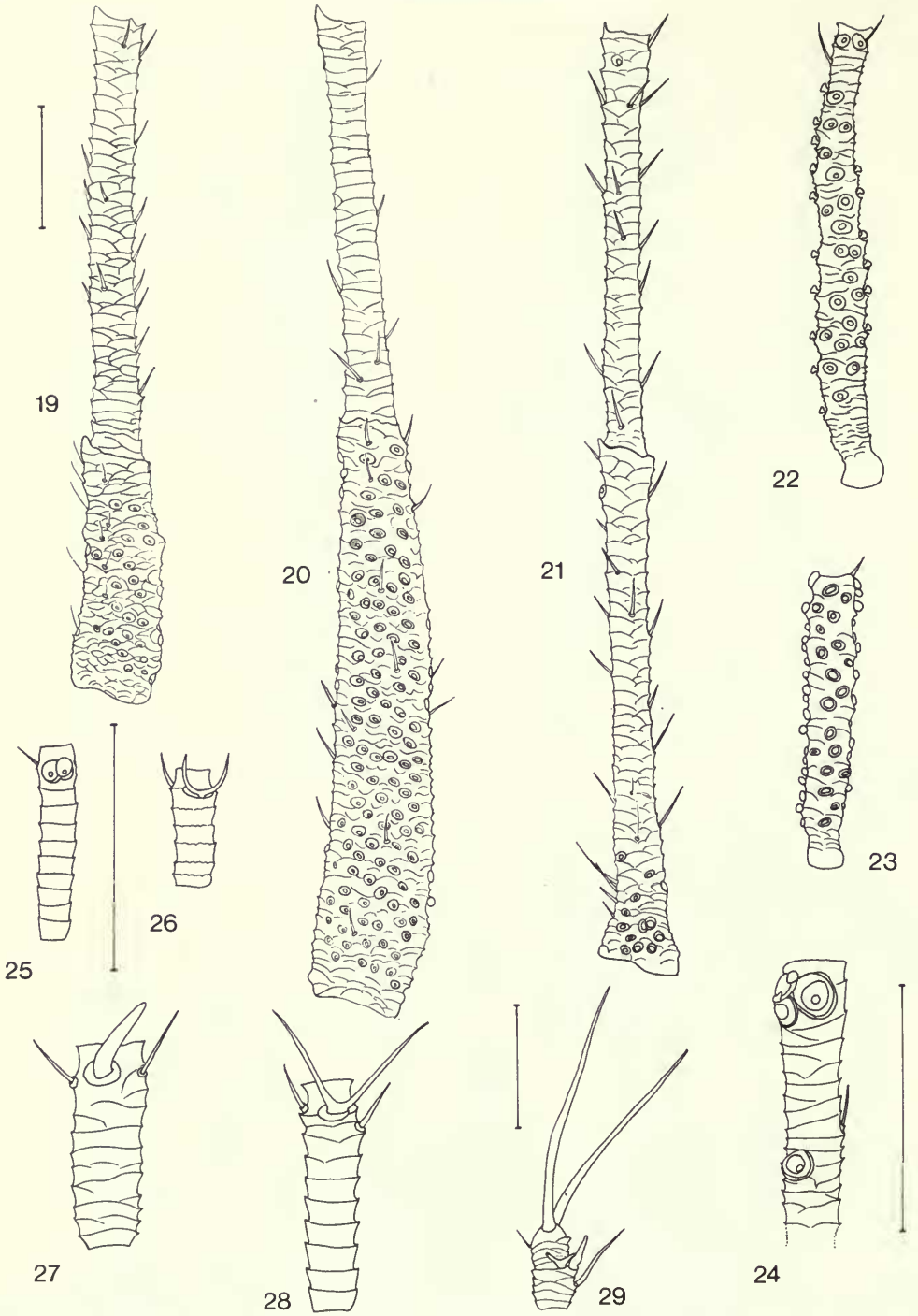
The *female genital complex* is usually conoid, with a subacute posterior apex (Fig. 127). The anal pore ring usually consists of a double ring of wax-producing cells and is rarely modified; in *Triozamia* species it is very convoluted (Fig. 62), in the *litseae*-group and some species of the *neoboutonia*-group of *Trioza* it is reduced to a single ring, and in *Trioza tundavalae* it is incomplete anteriorly and forms multiple rows posteriorly (Fig. 274). The base of the proctiger is much less sclerotised than in other groups of psyllids, and is sometimes membraneous around the anterior arch of the anal pore ring. The apical part of the proctiger is usually narrowed to a subacute apex but may be modified in various ways (Figs 138, 253, 274). The subgenital plate is triangular in profile and usually has a narrowly arcuate or subacute posterior margin. Occasionally the posterior margin is truncate or emarginate (Figs 89, 138). The lower valves of the ovipositor sometimes have teeth or ridges developed (Figs 128, 138, 273) which can be useful in species diagnosis.



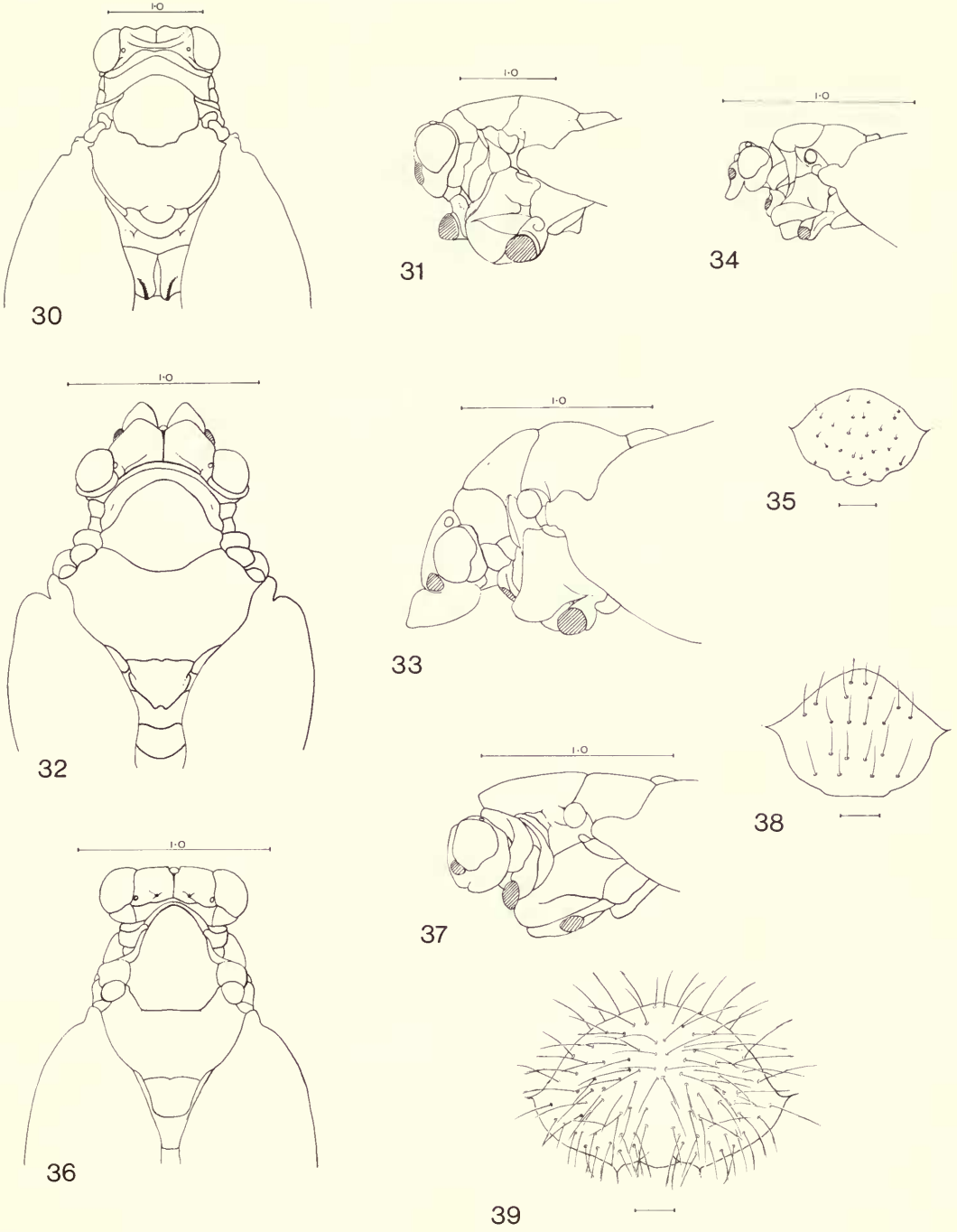
Figs 1–8 Afrotropical Triozidae, head and mouthparts structure. 1, *Afrotrioza bersama*, head, antero-dorsal view. 2, 7, 8, *Trioza erytreae*; 2, head, anterior view; 7, clypeus, lateral view; 8, ultimate rostral segment. 3, *Trichochermes insleyi*, head, lateral view. 4, *Pauropsylla trichaeta*, head, anterior view. 5, 6, *Triozamia lamborni*; 5, clypeus, lateral view; 6, ultimate rostral segment. (fl – frontal lobe; gc – genal cone.) Figs 1–4 drawn from dry mounted specimens.



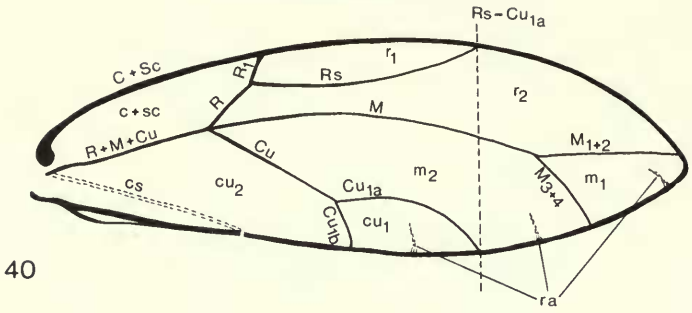
Figs 9–18 Afrotropical Triozidae, antennal structure. 9, *Trioza erytreae*, flagellum. 10, *T. medleri*, flagellum. 11, *Pauropsylla trigemma*, flagellum. 12, *P. breviantennata,* flagellum. 13, *Trioza afrobsoleta*, apical flagellomere. 14, *T. neoboutonia*, apical flagellomere. 15, *T. kakamegae*, apical flagellomere. 16, *T. dinaba*, apical flagellomere. 17, *T. anomalicornis*, apical flagellomere. 18, *T. tangae*, subapical and apical flagellomeres.



Figs 19–29 Afrotropical Triozidae, antennal structure. 19, *Triozamia lamborni*, 1st and 2nd flagellomeres. 20, *T. vondraceki*, 1st and 2nd flagellomeres. 21, *T. usambarensis*, 1st and 2nd flagellomeres. 22, *Trioza hargreavesi*, 1st flagellomere. 23, *T. mirificornis*, 1st flagellomere. 24, *T. theroni*, apical third of 1st flagellomere. 25, *T. dinaba*, 2nd flagellomere. 26, *T. pitkini*, 2nd flagellomere. 27, *T. capensis*, 2nd flagellomere. 28, *T. ghanaensis*, 4th flagellomere. 29, *Pauropsylla ngongae*, subapical and apical flagellomeres.



Figs 30–39 Afrotropical Triozidae, head and thorax structure. 30, 31, *Triozamia vondraceki*; 30, head and thorax, dorsal view; 31, same, lateral view. 32, 33, *Afrotrioza bersama*; 32, head and thorax, dorsal view; 33, same, lateral view. 34, 35, *Trioza erytreae*; 34, head and thorax, lateral view; 35, mesopraescutum, dorsal view. 36, 37, *T. tenuis*; 36, head and thorax, dorsal view; 37, same, lateral view. 38, *T. gonjae*, mesopraescutum, dorsal view. 39, *T. medleri*, mesopraescutum, dorsal view. Figs 30–34, 36, 37 drawn from dry mounted specimens.



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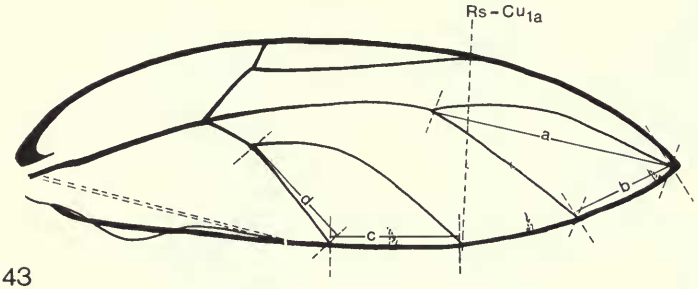

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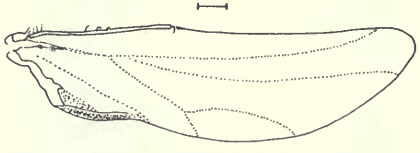

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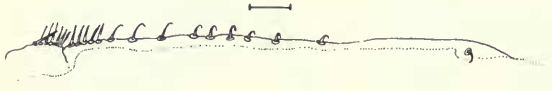

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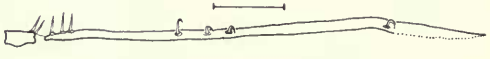

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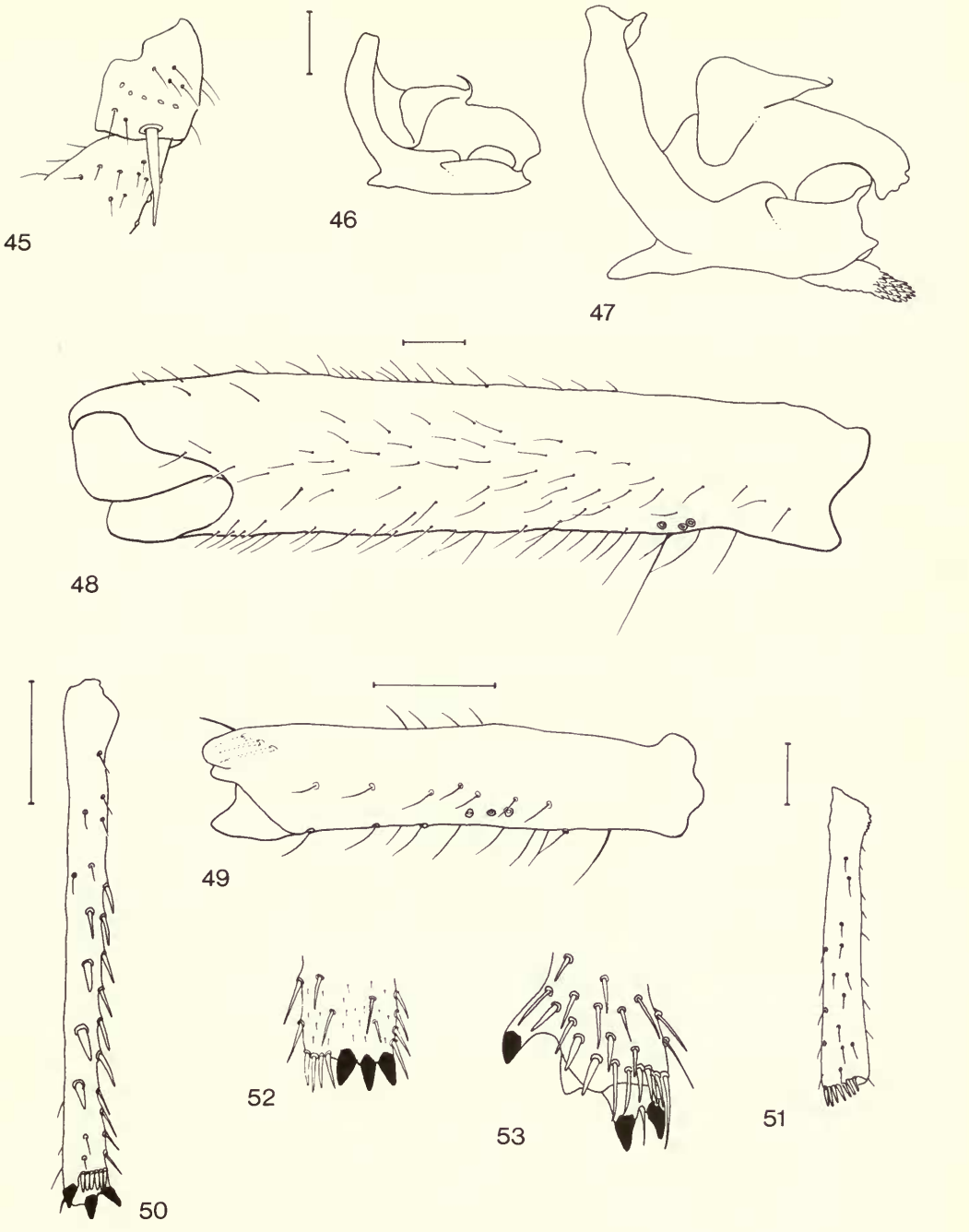
Figs 40–44 Afrotropical Triozidae, wing structure. 40–42, *Trioza erytreae*; 40, forewing, showing vein and cell nomenclature; 41, hindwing; 42, costal setae of hindwing. 43, *T. tenuis*, forewing (a/b = m_1 cell value, c/d = cu_1 cell value). 44, *Afrotrioza bersama*, costal setae of hindwing. (ra – radular areas, cs – claval suture.)



Figs 45–53 Afrotropical Triozidae, leg structure. 45, *Pauropsylla trichaeta*, fore coxa, anteroventral view. 46, 50, *Trioza etiennei*; 46, hind coxa, lateral view; 50, hind tibia, anterodorsal view. 47, *T. gonjae*, hind coxa, lateral view. 48, *Triozamia lamborni*, hind femur, posteroventral view. 49, 52, *Trioza erytreae*; 49, hind femur, posteroventral view; 52, apex of hind tibia, posteroventral view. 51, *T. karroo*, hind tibia, anterodorsal view. 53, *T. capensis*, apex of hind tibia, posterodorsal view.

Identification

The key presented below is intended to facilitate identification of Afrotropical triozid species; it does not reflect phylogenetic relationships. The concept of the 'genus' *Trioza*, used here, is admittedly artificial, hence *Trioza* species key out both before and after the other included genera.

Undoubtedly the user will have difficulty identifying species in the *erytreae-* and *anomalicornis*-groups of *Trioza* (couplets 57–65) because of their morphological homogeneity. As *T. erytreae* is of economic importance a summary of characters used to identify species of the *erytreae*-group is given in Table 4. Apart from *anomalicornis*, which has distinctive antennal characters, the other four species in this group can be separated on the basis of the shape of the male paramere and the apical segment of the aedeagus (see quadruplet 61, p. 22). No reliable characters were found which would discriminate between females of this group.

T. bussei and *T. similis* are excluded from the key because of insufficient data (see p. 69).

Key to species of Afrotropical Triozidae

1 Forewing with extensive brown-pigmented area either as a speckled pattern over most of wing, or as an infuscation along the medial vein and extending over posterior half of wing (Figs 69, 216, 245, 249) 2

— Forewing hyaline, if brown-pigmented areas are present they are restricted to the very base of wing (Fig. 188), or along course of R and R_1 veins (Figs 169, 194, 233, 272), or at points where veins meet wing margin (Fig. 202) 5

2 Forewing with brown speckled pattern over most of surface (Fig. 69); long and narrow, more than 3·5 times longer than wide; *Rs* strongly curved towards M_1 before reaching margin ***Trichochermes insleyi*** Capener (p. 26)

— Forewing with brown infuscation along M stem and across posterior half of wing; broader, at most slightly more than 3 times longer than wide; *Rs* continuously divergent from M stem (Figs 216, 245, 249) 3

3 Small species, forewing not more than 1·8 mm long; antennal flagellum short, about as long as head width; genal cones absent ..... ***Trioza pitkini*** sp. n. (p. 59)

— Larger species, forewing more than 2 mm long; antennal flagellum more than 1·5 times longer than head width; genal cones well developed 4

4 Hind tibia with well-developed apical spurs; *cu* cell value 1·07–1·40; ♀ proctiger blunt, rounded apically in profile ..... ***Trioza laingi*** sp. n. (p. 64)

— Hind tibia without apical spurs but with a crown of stout setae; *cu* cell value 1·48–1·79; ♀ proctiger acute, extended apically in profile ..... ***Trioza karroo*** sp. n. (p. 63)

5 Forewing with a radular area present in cell r_2 as well as in cells m_1, m_2 and cu_2, but if absent then apex of claval suture in close proximity to apex of Cu_{1b} (Figs 56, 65); $C+Sc$ greatly thickened along its whole length and more than twice as thick as R stem 6

— Forewing with radular area absent from cell r_2 and apex of claval suture distant from apex of Cu_{1b}; $C+Sc$ not or hardly thickened and at most slightly thicker than R stem 9

6 Metabasitarsus with a single apical spur; antenna short, flagellum 0·91–0·98 times as long as head width, 1st flagellomere without rhinaria; aedeagus 2-segmented ***Afrotrioza bersama*** sp. n. (p. 25)

— Metabasitarsus without apical spurs; antennal flagellum 1·5–2·0 times longer than head width, 1st flagellomere bearing several rhinaria and often thickened (Figs 19–21); aedeagus 3-segmented (*Triozamia* spp.) 7

7 First flagellomere not at all thickened and bearing only 4–8 rhinaria basally; ♀ proctiger relatively short, 0·97–1·01 times as long as head width ..... ***Triozamia usambarensis*** sp. n. (p. 24)

— First flagellomere thickened and almost completely covered with rhinaria; ♀ proctiger longer, 1·2–1·54 times longer than head width 8

8 First flagellomere 1·39–1·47 times longer than 2nd flagellomere; apical aedeagal segment 0·52–0·56 times as long as medial aedeagal segment ..... ***Triozamia vondraceki*** sp. n. (p. 24)

— First flagellomere 0·63–0·76 times as long as 2nd flagellomere; apical aedeagal segment longer than medial aedeagal segment ..... ***Triozamia lamborni*** (Newstead) (p. 23)

9 Vertex dish-like, evenly and roundly concave, not at all raised or interrupted along median suture, margin of 'dish' complete, sharp, finely serrate ..... ***Trioza afrosersalisia*** sp. n. (p. 54)

— Vertex convex, flat, or at most weakly concave on either side of median suture which clearly divides vertex into two halves; if median suture absent then forewing, at most, 2·3 times longer than wide 10
10 *M* branching proximal to $Rs–Cu_{1a}$ line 11
— *M* branching distal to $Rs–Cu_{1a}$ line 26
11 Hindwing very reduced and scale-like 12
— Hindwing not less than one-third the length of forewing 14
12 Angle at which R_1 branches from *Rs* greater than 90° (Fig. 178); genal cones short; terminal setae of apical flagellomere subequal ..... ***Trioza afrobsoleta*** sp. n. (p. 52)
— Angle at which R_1 branches from *Rs* 90° or less; genal cones long; apical flagellomere with one long and one short terminal seta 13
13 m_1 cell value 1·72–1·74, cu_1 cell value 2·9–3·0; hindwing with broad, almost truncate apex (Fig. 189) ..... ***Trioza boxi*** sp. n. (p. 53)
— m_1 cell value 1·91–2·08, cu_1 cell value 1·96–2·63; hindwing with narrow, subacute apex (Fig. 184) ..... ***Trioza gonjae*** sp. n. (p. 53)
14 *Cu* stem not more than half (0·45) the length of Cu_{1b} 15
— *Cu* stem not less than half (0·6) the length of Cu_{1b} 17
15 Densely pubescent species; genal cones long, well developed; forewing rounded apically (Fig. 254) ..... ***Trioza medleri*** sp. n. (p. 65)
— Weakly pubescent species; genae rounded, cones not developed; forewing subacute apically (Figs 237, 265) 16
16 Forewing more than 3 times longer than wide; 1st flagellomere about twice as long as 2nd; R_1 short, about half as long as *R* stem; inner apical spurs of both hind tibiae together numbering 5 or 6; paramere as in Fig. 266; dorsal valve of ovipositor smooth apically ***Trioza tenuis*** sp. n. (p. 67)
— Forewing about 2·5 times longer than wide; 1st flagellomere about 3 times as long as 2nd; R_1 about as long as *R* stem; inner apical spurs of both hind tibiae together numbering 4; paramere as in Fig. 239; dorsal valve of ovipositor serrate apically ***Trioza ghanaensis*** sp. n. (p. 62)
17 Antennal flagellum not less than 1·5 times longer than head width 18
— Antennal flagellum not more than 1·3 times longer than head width 19
18 Distal segment of aedeagus with a large basal expansion (Fig. 222); cell r_2 of forewing with spinules apically (Fig. 219) ..... ***Trioza glabea*** sp. n. (p. 59)
— Distal segment of aedeagus with a small basal expansion (Fig. 224); cell r_2 of forewing devoid of spinules ..... ***Trioza usambarica*** sp. n. (p. 60)
19 First flagellomere with at least one rhinarium apically and usually two or three ***Trioza theroni*** sp. n. (p. 67)
— First flagellomere without rhinaria 20
20 Larger species, forewing 2·75–6·00 mm long; antennal flagellum more than twice as long as head width 21
— Smaller species, forewing less than 2 mm long; antennal flagellum about as long as head width 22
21 Forewing about 6 mm long, less than 2·5 times longer than wide; course of *R* stem and R_1 brown-pigmented (Fig. 272) ..... ***Trioza tundavalae*** sp. n. (p. 68)
— Forewing about 3 mm long and about 2·8 times longer than wide and unpigmented (Fig. 256) ***Trioza schroederi*** sp. n. (p. 65)
22 Pronotum with a median and two lateral raised tubercles (Fig. 203) 23
— Pronotum without raised tubercles 24
23 Antennal flagellum 0·7 times as long as head width; m_1 cell value 1·62, cu_1 cell value 2·9; brown-pigmented areas present where veins reach wing margin (Fig. 202) ***Trioza messaratina*** sp. n. (p. 57)
— Antennal flagellum 1·06–1·23 times longer than head width; m_1 cell value 1·25–1·45, cu_1 cell value 1·07–1·38; forewing hyaline (Fig. 198) ..... ***Trioza etiennei*** sp. n. (p. 56)
24 Wing veins with short setae, m_1 cell without spinules; antennal flagellum 1·11–1·23 times longer than head width; ♂ paramere long and slender, with a pair of teeth apically (Fig. 215) ***Trioza camerounensis*** sp. n. (p. 58)
— Wing veins with long setae; m_1 cell with spinules apically; antennal flagellum not more than 0·91 times as long as head width; ♂ paramere 'thumb-shaped' with a transverse ridge in apical third (Figs 210, 213) 25
25 Rhinaria on flagellomeres 2, 4, 6 and 7 each with a short bifid sensillum; ♂ paramere with a

transverse ridge one-third below apex (Fig. 210) ..... ***Trioza seranistama*** sp. n. (p. 58)

— Rhinarium of flagellomere 2 with a long bifid sensillum; inner transverse ridge of ♂ paramere apical (Fig. 213) ..... ***Trioza nestasimara*** sp. n. (p. 58)

26 Forewing with course of *R* stem and R_1 marked with brown pigment (Figs 169, 194, 233)..... 27

— Course of *R* stem and R_1 unpigmented..... 29

27 m_1 cell value more than 1·8; forewing about twice as long as hindwing; abdomen with setae on tergites 6–8 ..... ***Trioza mimusops*** sp. n. (p. 54)

— m_1 cell value less than 1·3; forewing at most 1·8 times longer than hindwing; abdomen with setae on first two visible tergites at most 28

28 Antennal flagellum about twice as long as head width; ultimate rostral segment shorter than apical flagellomere ..... ***Trioza fuscivena*** sp. n. (p. 61)

— Antennal flagellum about as long as head width; ultimate rostral segment about twice as long as apical flagellomere ..... ***Trioza nachingweae*** sp. n. (p. 49)

29 Angle of R_1 and *Rs* branch obtuse (Fig. 178)..... ***Trioza afrobsoleta*** sp. n. (p. 52)

— Angle of R_1 and *Rs* branch 90° or less..... 30

30 First flagellomere thickened and bearing about 40 rhinaria 31

— First flagellomere not or hardly thickened, devoid of rhinaria..... 32

31 Larger species, forewing length of ♂ 4·4–5·0, of ♀ 5·0–5·4; m_1 cell value 1·32–1·6; 3rd flagellomere without rhinaria; lower valves of ovipositor saw-like apically ***Trioza hargreavesi*** sp. n. (p. 50)

— Smaller species, forewing length 3·2–3·9 in ♂ and 4·1–4·6 in ♀; m_1 cell value 1·13–1·29; 3rd flagellomere bearing several rhinaria; lower valves of ovipositor smooth ***Trioza mirificornis*** sp. n. (p. 51)

32 Forewing membrane with spinules in addition to radular areas 33

— Forewing membrane devoid of spinules apart from radular areas 35

33 Forewing short and broad, 2·25–2·57 times longer than wide, with rounded apex (Fig. 241); antennal flagellum about as long as head width; apex of hind tibia without spurs ***Trioza guiera*** sp. n. (p. 62)

— Forewing more than 2·5 times longer than wide, with subacute apex; antennal flagellum more than 1·5 times longer than head width; apex of hind tibia with well-developed spurs..... 34

34 Apex of hind tibia with two inner apical spurs; forewing 2·71–3·43 times longer than wide; antennal flagellum 1·94–2·53 times longer than head width; ultimate rostral segment 1·0–1·4 times longer than apical flagellomere ***Trioza litseae*** Bordage (p. 43) and ***T. xylopia*** sp. n. (p. 43)

— Apex of hind tibia with three inner apical spurs; forewing 2·60–2·89 times longer than wide; antennal flagellum 1·62–1·97 times longer than head width; ultimate rostral segment 1·3–2·0 times longer than apical flagellomere ..... ***Trioza eafra*** sp. n. (p. 42)

35 Hind tibia shorter than width of head, apex expanded, basal spine well developed, outer apical spur enlarged and displaced to a subapical position (Fig. 53); male genitalia as in Figs 226–228 ..... ***Trioza capensis*** sp. n. (p. 55)

— Hind tibia longer than width of head, apex not expanded, basal tubercles small and poorly developed, outer apical spur not enlarged or displaced; male genitalia another shape..... 36

36 Forewing narrow, not less than 2·5 times longer than wide, with angular or subangular apex, m_1 cell value greater than 1·1 37

— Forewing broadly rounded apically (Figs 75, 80, 83, 84, 86), not more than 2·3 times longer than wide, m_1 cell value not more than 1·05 (*Pauropsylla* species) 39

37 Second flagellomere with a double rhinarium (Fig. 25) 38

— Second flagellomere with a single rhinarium..... 51

38 *Cu* stem long, more than 2·8 times longer than Cu_{1b}, branching from *R*+*M*+*Cu* proximally to *R* branch (Fig. 165); ♂ paramere and aedeagus as in Figs 166–168 ..... ***Trioza dinaba*** sp. n. (p. 49)

— *Cu* stem not more than 2·6 times longer than Cu_{1b}, branching from *R*+*M*+*Cu* at or slightly distal to *R* branch; ♂ paramere and aedeagus as in Figs 162–164 .... ***Trioza bamendae*** sp. n. (p. 48)

39 Fore trochanter with a well-developed ventroapical spur (Fig. 45)..... 40

— Fore trochanter without a ventroapical spur..... 42

40 Clypeus with a pair of setae; ultimate rostral segment with a pair of short setae; ♀ genital segment rounded triangular in profile, subgenital plate without a ventral transverse groove ***Pauropsylla tatrichea*** sp. n. (p. 30)

— Clypeus with several short setae, ultimate rostral segment with a pair of long setae and a pair of

short setae; ♀ genital segment angular in profile, subgenital plate with a ventral transverse groove 41

41 In final instar larva sectasetae present on dorsum, marginal sectasetae widely spaced and of uneven length (Fig. 280) ..... ***Pauropsylla willcocksi*** Dçbski (p. 29)

— Final instar larva without sectasetae on dorsum, marginal sectasetae closely spaced and of even length (Fig. 282) ..... ***Pauropsylla trichaeta*** Pettey (p. 30)

42 Antenna with 6 flagellomeres (Fig. 12) ..... ***Pauropsylla breviantennata*** sp. n. (p. 31)

— Antenna with 8 flagellomeres 43

43 Basitarsus of each leg 1·5–2·0 times longer than corresponding apical tarsal segment; median suture of vertex absent ..... ***Pauropsylla longipes*** sp. n. (p. 33)

— Basitarsus of each leg short, hardly longer than corresponding apical segment; median suture of vertex present although sometimes incomplete posteriorly 44

44 ♂ proctiger with greatly expanded lateral lobes (Fig. 97); ♀ abdomen with sternite 6 much less sclerotised than other segments and membranous ventrally ..... ***Pauropsylla eastopi*** sp. n. (p. 33)

— ♂ proctiger flask-shaped, without expanded lateral lobes; ♀ abdomen with evenly sclerotised sternites 45

45 Antennal flagellomeres 4 and 6 each bearing two apical rhinaria and each of these with a bifid sensillum (Fig. 11) 46

— Antennal flagellomeres 4 and 6 each with a single apical rhinarium which does not bear a bifid sensillum 47

46 Forewing broader, about 1·8 times longer than wide, veins bearing long setae, at least in proximal half of wing (Fig. 83) ..... ***Pauropsylla ngongae*** sp. n. (p. 31)

— Forewing narrower, about 2·25 times longer than wide, veins bearing short setae (Fig. 80) ***Pauropsylla trigemma*** sp. n. (p. 31)

47 ♂ aedeagus with a complex apical segment (Figs 88, 91); ♀ subgenital plate with a ventroapical notch (Figs 89, 92) 48

— ♂ aedeagus with a simple apical segment (Figs 94, 103, 106); ♀ subgenital plate with a smoothly rounded or straight posterior margin 49

48 ♂ paramere broadening towards apex and with a transverse inner apical ridge (Fig. 87); posterior margin of ♀ subgenital plate weakly notched and bordered with short setae (Fig. 89) ..... ***Pauropsylla septima*** sp. n. (p. 32)

— ♂ paramere narrowing towards apex which is twisted and abcurved (Fig. 90); posterior margin of ♀ subgenital plate deeply notched and bordered with long setae (Fig. 92) ***Pauropsylla proxima*** sp. n. (p. 32)

49 Smaller species, forewing less than 1·9 mm long in ♂ and 2·1 in ♀; hind tibia less than 0·57 mm long; median suture of vertex incomplete and evanescing towards occiput; ♂ paramere as in Fig. 105; ♀ genital segment subrectangular in profile..... ***Pauropsylla senegalensis*** sp. n. (p. 34)

— Larger species, forewing more than 2·4 mm long; hind tibia more than 0·58 mm long; median suture of vertex complete to occiput; ♂ paramere as in Figs 93, 102; ♀ genital segment rounded triangular in profile 50

50 Larger species, hind tibia more than 0·75 mm long; ♂ paramere clavate, with an inner apical transverse ridge (Fig. 93); posterior margin of ♀ subgenital plate truncate ***Pauropsylla angolensis*** sp. n. (p. 33)

— Smaller species, hind tibia not more than 0·7 mm long; ♂ paramere conical with an apical pair of spines (Fig. 102); posterior margin of ♀ subgenital plate rounded ***Pauropsylla mistura*** sp. n. (p. 34)

51 *Cu* stem relatively short, not more than 1·5 times longer than Cu_{1b} 52

— *Cu* stem longer, not less than 1·6 times longer than Cu_{1b} 53

52 Hind tibia with one outer and three inner apical spurs; ultimate rostral segment narrow, almost twice as long as wide; ♂ paramere with a long abcurved anteroapical process (Fig. 231) ***Trioza ficicola*** sp. n. (p. 60)

— Hind tibia with one outer and two inner apical spurs; ultimate rostral segment broad, not more than 1·5 times longer than wide; ♂ paramere with a simple rounded and notched apex (Fig. 157) ..... ***Trioza harteni*** sp. n. (p. 47)

53 Apical flagellomere twice as long as flagellomere 7 ..... ***Trioza tangae*** sp. n. (p. 66)

— Apical flagellomere at most slightly longer than flagellomere 7 54

54 Flagellomeres bearing long subapical setae, apical flagellomere with one apical seta and a flat discoid sense organ (Fig. 17) ..... ***Trioza anomalicornis*** sp. n. (p. 44)

— Flagellomeres with short subapical setae, apical flagellomere with one long and one short terminal seta 55
55 Second flagellomere 1·76–2·35 times longer than 3rd; inner apical spurs of both hind tibiae together numbering at most 4 56
— Second flagellomere about as long as 3rd; inner apical spurs of both hind tibiae together numbering 6 or rarely 5 57
56 m_1 cell value 1·10–1·23, cu_1 cell value 1·6–1·9 ..... ***Trioza neoboutonia*** sp. n. (p. 46)
— m_1 cell value 1·40–1·65, cu_1 cell value 2·00–2·82 ..... ***Trioza chiangae*** sp. n. (p. 48)
57 All visible abdominal tergites with a transverse row of setae; setae on wing veins twice as long as width of veins ..... ***Trioza tiliacora*** sp. n. (p. 41)
— Transverse row of setae present only on first two visible abdominal tergites; setae on wing veins shorter than width of veins 58
58 Ratio of head width to length of ultimate rostral segment 4·6:1 or more 59
— Ratio of head width to length of ultimate rostral segment 4·5:1 or less 60
59 Smaller species, forewing length less than 2·6 in ♂ and 2·9 in ♀; ♂ paramere broadening towards apex which is truncate (Fig. 118) ..... ***Trioza kilimanjarica*** sp. n. (p. 40)
— Larger species, forewing length more than 3·0 in ♂ and 3·3 in ♀; paramere broad medially but narrowing to subacute apex ..... ***Trioza ata*** sp. n. (p. 40)
60 Ventral valves of ovipositor with strong transverse ridges, giving the valves a saw-like appearance (Fig. 138); paramere as in Figs 141, 144, 147, 150 61
— Ventral valves of ovipositor smooth or with a few weak serrations apically; paramere as in Figs 110, 112, 114, 123 62
61 Paramere as in Fig. 141 ..... ***Trioza kakamegae*** sp. n. (p. 45)
— Paramere as in Fig. 144 ..... ***Trioza thibae*** sp. n. (p. 45)
— Paramere as in Fig. 147 ..... ***Trioza tavandula*** sp. n. (p. 46)
— Paramere as in Fig. 150 ..... ***Trioza luvandata*** sp. n. (p. 46)
62 cu_1 cell value not more than 2·4 in ♂ and 2·45 in ♀; forewing, at most, 1·58 times longer than hindwing 63
— cu_1 cell value not less than 2·55; forewing, at least 1·59 times longer than hindwing 64
63 ♂ paramere conical, in profile narrowing towards apex which is abcurved (Fig. 123); ♂ proctiger broader than long due to strong lateral expansions (Fig. 122)
Trioza carvalhoi sp. n. (p. 41)
— ♂ paramere ovoid, in profile broadening medially then narrowing towards apex (as in Fig. 110); ♂ proctiger narrower with less well-developed lateral lobes (as in Fig. 109)
Trioza capeneri sp. n. (p. 42)
64 ♂ paramere and aedeagus as in Figs 114, 115 ..... ***Trioza gregoryi*** sp. n. (p. 40)
— ♂ paramere and aedeagus as in Figs 110–113 65
65 Ratio of head width to length of 1st flagellomere not more than 1·25:1 ... ***Trioza catlingi*** sp. n. (p. 39)
— Ratio of head width to length of 1st flagellomere not less than 1·26:1
Trioza erytreae (Del Guercio) (p. 36) and ***T. menispermicola*** sp. n. (p. 40)

TRIOZAMIA Vondráček

Triozamia Vondráček, 1963: 266. Type-species: *Rhinopsylla lamborni* Newstead, by original designation and monotypy.

Description. Head, from above, slightly narrower than mesoscutum, in profile at 90° to longitudinal axis of body; occipital margin angular, occiput concave; vertex with a median suture, without frontal lobes; median ocellus not visible from above, frons just visible in anterior view; genae slightly swollen ventrally; 1st flagellomere bearing several rhinaria, flagellomeres 4, 6 and 7 bearing a single subapical rhinarium; clypeus prominent, densely setose. Thorax, in profile, weakly arched; pronotum clearly visible from above and strongly rounded down anteriorly behind occiput; propleural suture diagonal but both pleurites in contact with lateral margin of pronotum; forewing elongate oval with a subangular apex, *C+Sc* strongly thickened, *M* branching proximally to $Rs-Cu_{1a}$ line, claval suture reaching hind margin of wing at same point as apex of Cu_{1b}, radular spines present in cells r_2 (sometimes weak or absent), m_1, m_2 and cu_1; hindwing well developed, costal margin densely setose both proximally and immediately distal to the costal break. Hind coxa with a weakly developed meracanthus and without anterior lobe; hind femur not thickened medially, ventral sense organs basally positioned with the most distal organ slightly separated from the proximal pair; hind tibia with well-developed basal spine, and an inner apical group of

well-developed spurs. Abdomen with setae on all tergites; ♂ proctiger bipartite; aedeagus 3-segmented; anal pore of ♀ proctiger with a double, convoluted ring of wax-producing cells.

COMMENTS. When Vondráček described this genus he placed it in the Bactericerinae of the Ciriacreminidae (sensu Heslop-Harrison, 1958; nec Hollis, 1976). Klimaszewski (1964) rightly removed the Bactericerinae to the Triozidae, recognising the true relationships of the group, and Bekker-Migdisova (1973) separated *Triozamia* from the other Bactericerinae on a suite of both derived (bipartite ♂ proctiger, 3-segmented aedeagus) and primitive (proximity of apex of claval suture to apex of Cu_{1b}, radulae area in r_1) characters. The genus has retained many primitive features in addition to those mentioned by Bekker-Migdisova, notably the flattened thorax and unmodified prosternum, the basal position of the ventral sense organs on the hind femur and the presence of setae on all abdominal tergites. Her statement of a 'distinct sclerotisation of the pterostigma' is probably a misinterpretation of the thickening of *C+Sc*, a true pterostigma being absent. Other derived features of the genus include the large number of rhinaria on the first flagellomere and the usual absence of a rhinarium on flagellomere 2, but these offer no indication of the relationships of the genus to the rest of the Triozidae.

Three included species are treated below.

Triozamia lamborni (Newstead)

(Figs 5, 6, 19, 48, 63, 64, 275, 276)

Rhinopsylla lamborni Newstead, 1914: 520; Eastop, 1961: 168. Holotype ♂, NIGERIA: 'Lagos, 70 m. E. nr Oni clearing' [not traced].
Triozamia lamborni (Newstead); Vondráček, 1963: 266, partim; Akanbi, 1981: 113.
Triozamia lambourni [sic] (Newstead); Roberts, 1969: 78.

DESCRIPTION. Adult. Having generic characters stated above. Integument of thoracic dorsum sparsely short-haired but mesoscutellum and metascutum more densely haired. Vertex pentagonal, steeply sloping downwards, slightly concave; ultimate rostral segment 4–5 times longer than apical flagellomere, densely haired; antennal flagellum 1·71–2·04 times longer than head width, 1st flagellomere 0·63–0·76 times as long as 2nd flagellomere, thickened and with a large number of rhinaria, 2nd flagellomere without a rhinarium, flagellomeres 4, 6 and 7 each with a single subapical rhinarium, apical flagellomere with one moderately long and pointed seta and one shorter and truncate seta terminally. Mesopraescutum, from above, rounded rhomboidal, wider than long and with a broadly arcuate anterior margin; forewing 2·66–2·81 times longer than wide, apart from radular areas there is a patch of spinules in *c+sc*, veins moderately densely setose, R_s long, *M* branching proximal to $R_s - Cu_{1a}$ line, m_1 cell value 4·9–6·0, cu_1 cell ratio 0·4–0·5; costal setae of hindwing, distal to costal break, divided into two groups; hind tibia with an inner apical group of 5–6 strongly developed spurs and an outer apical group of about 10 thickened setae; hind basitarsus elongate. Abdomen with a pair of lateral eversible sacs on segment 4; ♂ proctiger and genitalia as in Figs 59, 63, 64, apical segment of aedeagus 1·12–1·23 times longer than medial segment; ♀ genital segment with proctiger 1·20–1·27 times longer than head width, ovipositor valves smooth.

Measurements (7 ♂, 5 ♀). Maximum width of head, ♂ 1·23–1.30, ♀ 1·30–1·35; length of antennal flagellum, ♂ 2·22–2·51, ♀ 2·31–2·51; length of ultimate rostral segment, ♂ 0·41–0·46, ♀ 0·45–0·50; length of forewing, ♂ 4·05–4·33, ♀ 4·21–4·58; length of hind tibia, ♂ 0·90–1·00, ♀ 0·95–1·05.

Fifth instar larva (Figs 275–277). Body clearly divided into head, thorax and abdomen, about 1·1 times longer than wide. Antenna with 8 flagellomeres. Small prothoracic sclerites present behind cephalo-prothorax, meso- and metathoracic sclerites separated. Forewing bud about 0·92 mm long, humeral lobes not at all developed. Caudal plate about half as long as wide and does not include first 4 abdominal segments; anus terminal or terminodorsal, anus and pore ring as in Fig. 277, caudal plate with a complicated arrangement of wax pores on dorsal and ventral surfaces (Fig. 276). No sectasetae present but caudal plate bears 8 small dorsomarginal lanceolate setae positioned as in Fig. 276.

HOST PLANT. Larvae and adults collected from *Antiaris toxicaria africana* var. *africana* (Moraceae). The larvae are free-living and produce copious wax strands.

DISTRIBUTION. Senegal, Ivory Coast, Ghana, Nigeria, Zaire and Tanzania.

COMMENTS. *T. lamborni* may be distinguished from the other two known species in the genus by the characters given in Table 2.

Table 2 Characters for the separation of the three African species of *Triozamia*.

	length of flagellomere 1 / length of flagellomere 2	length of apical aedeagal segment / length of medial aedeagal segment	paramere	length of ♀ proctiger / head width
lamborni	0·63–0·76	1·12–1·23	Fig. 63	1·20–1·27
usambarensis	1·1–1·26	0·96–0·97	Fig. 57	0·97–1·01
vondraceki	1·39–1·47	0·52–0·56	Fig. 60	1·52–1·54

The material upon which Vondráček based his redescription of this species was a mixed series, the Ugandan specimens and his figs 18 and 26 being *vondraceki*.

The presence of three clearly recognisable species of *Triozamia* in Africa raises some interesting questions on the taxonomy of the host plant genus *Antiaris*. In a recent review of African Moraceae Berg (1977) recognises one African species, *Antiaris toxicaria*, which also occurs in Asia and Australia. Berg refers the African populations to the subspecies *africana* and further recognises three varieties, *africana, welwitschii* and *usambarensis*, all with partially overlapping distributions (Berg, 1977: fig. 8).

Of the three *Triozamia* species on *Antiaris, lamborni* is known from Senegal, Ivory Coast, Ghana, Nigeria, northern Zaire and Tanzania (Pare Mountains and Uluguru Mountains); *vondraceki* is described from Uganda and the Central African Republic; and *usambarensis* is described from Tanzania (Usambara Mountains). It seems likely that the three psyllid species maintain their genetic independence each on one of three 'varieties' of *Antiaris toxicaria africana*.

Triozamia usambarensis sp. n.

(Figs 21, 56–58)

Description. Adult. Very similar to *T. lamborni* but slightly larger. First flagellomere 1·10–1·26 times longer than 2nd flagellomere, not thickened and bearing only 4–12 rhinaria on basal half, a subapical rhinarium rarely present on 2nd flagellomere. Apical segment of aedeagus 0·96–0·97 times as long as medial aedeagal segment, paramere as in Fig. 57; ♀ proctiger short, 0·97–1·01 times as long as head width.

Measurements (2 ♂, 2 ♀). Maximum width of head, ♂ 1·41–1·43, ♀ 1·48–1·51; length of antennal flagellum, ♂ 2·4, ♀ antennae incomplete; length of ultimate rostral segment, ♂ 0·37–0·39, ♀ 0·40; length of forewing, ♂ 5·51–5·57, ♀ 6·10–6·12; length of hind tibia, ♂ 1·11 ♀ 1·17–1·20.

Larva. Unknown.

Host plant. Adults collected from *Antiaris toxicaria africana* var. *usambarensis* (Moraceae).

Holotype ♂, **Tanzania**: Lushoto, 23.vi.1977, *Antiaris usambarensis* (*Wadudu Msituni*) (BMNH; slide mounted).

Paratypes. **Tanzania**: 1 ♂, 1 ♀, same data as holotype; 1 ♂, 1 ♀, Lushoto, 22.ix.1977, 'ex scales on Hirus' [probably an error of transliteration from a handwritten label]; 1 ♂, 1 ♀, Lushoto Silv. Arb. 22.ix.1980, *Antiaris usambarensis* (*Wadudu Msituni*) (BMNH; slide and dry mounted).

Comments (see also under *T. lamborni*). This species is described from seven rather poorly preserved specimens, all from approximately the same locality. However, they were collected on three separate occasions over a period of three years and the population is clearly maintaining its morphological identity from the other two species of the genus. The type-locality is close to that of *Antiaris usambarensis* (see Berg, 1977: 318).

Triozamia vondraceki sp. n.

(Figs 20, 30, 31, 59–62)

[*Triozamia lamborni* Newstead; Vondráček, 1963: 268, partim (figs 18, 26). Misidentification.]

Description. Adult. Very similar to *T. lamborni* and *T. usambarensis* but larger. First flagellomere

1·39–1·47 times longer than 2nd flagellomere, swollen and almost completely covered with rhinaria, 2nd flagellomere without a subapical rhinarium. Apical aedeagal segment short, 0·52–0·56 times as long as medial aedeagal segment; paramere as in Fig. 60; ♀ proctiger long, 1·52–1·54 times longer than head width.

Measurements (3 ♂, 2 ♀). Maximum width of head, ♂ 1·53–1·63, ♀ 1·81–1·83; length of antennal flagellum, ♂ 2·64–2·77, ♀ 2·87–2·96; length of ultimate rostral segment, ♂ 0·47–0·50, ♀ 0·52; length of forewing, ♂ 5·69–6·16, ♀ 6·96–7·26; length of hind tibia, ♂ 1·26–1·38, ♀ 1·45–1·57.

Larva. Unknown.

HOST PLANT. Adults collected from *Antiaris toxicaria africana* var. ?.

Holotype ♂, **Uganda**: Kampala, 8.x.1915 (*C. C. Gowdey*) (BMNH; dry mounted).

Paratypes. **Uganda**: 1 ♂, 1 ♀, same data as holotype; 5 ♂, 6 ♀, 17.xi.1915 (*C. C. Gowdey*); 2 ♂, 20.ii.1923 (*H. Hargreaves*); 2 ♂, 27.ii.1925, 'Kirundo' (*Antiaris africana*) (*J. L. R. Hanwer*). **Central African Republic**: 1 ♂, Route Mbalé, P.L., 12.ii.1969 (*M. Boulard*) (BMNH; slide and dry mounted).

COMMENT. See under *T. lamborni*.

AFROTRIOZA gen. n.

Type-species: *Afrotrioza bersama* sp. n.

DESCRIPTION. Head, from above, narrower than mesoscutum, in profile continuing axis of anterior part of thorax; occipital margin sharp; median suture of vertex moderately developed, frontal lobes well developed; median ocellus visible from above, frons completely covered by genal cones; latter large and well developed, constricted basally and in parallel plane to vertex; antenna with a single subapical rhinarium on each of flagellomeres 2, 4, 6 and 7; clypeus not prominent, with several short setae. Thorax, in profile, strongly arched; pronotum clearly visible from above and scarcely rounded down behind occiput, prothoracic suture diagonal with both pleurites in contact with lateral margin of pronotum; forewing elongate oval, narrowing to subangular apex, radular areas present in cells r_2, m_1, m_2 and cu_1, $C+Sc$ strongly thickened, M branching proximal to $Rs-Cu_{1a}$ line, claval suture reaching hind margin a short distance proximal to apex of Cu_{1b}; hindwing well developed, costal margin densely setose proximal to costal break, costal setae distal to costal break not clearly grouped; hind coxa with a well-developed meracanthus, anterior lobe absent; ventral sense organs of hind femur medially placed; hind tibia with a small basal spine, with one outer and four inner apical spurs; hind basitarsus with an outer apical spur. Abdomen with setae on all tergites; ♂ proctiger unipartite, aedeagus 2-segmented.

COMMENTS. This monotypic genus shows a mixture of both primitive and derived character states and is clearly defined from all other described triozids by the presence of an apical spur on the hind basitarsus. The shape of the genal cones is similar to that of *Trichochermes* but the thorax is strongly arched. It shares such primitive character states with *Triozamia* as the presence of a radular area in r_1 and an unmodified prothorax.

Afrotrioza bersama sp. n.

(Figs 1, 32, 33, 44, 65–68, 278, 279)

DESCRIPTION. Adult. Having generic characters stated above. Large species, head width 0·91–0·97 mm. Integument of thoracic dorsum almost devoid of setae but genal cones, legs and abdomen densely setose. Vertex pentagonal, with a deep concavity on either side of median suture; antennal flagellum short, 0·91–0·98 times as long as head width, apical flagellomere with one moderately long pointed seta and one very short truncate seta terminally; ultimate rostral segment about twice as long as apical flagellomere, sparsely haired. Mesopraescutum, from above, rounded rhomboidal and almost as long as wide, with an arcuate anterior margin; forewing 2·27–2·40 times longer than wide, membrane moderately densely covered with spinules, veins densely short haired, *Rs* long, m_1 cell value 2·73–3·07, cu_1 cell value 0·73–0·83; hind tibia with one outer and four inner apical spurs; hind basitarsus short. ♂ genitalia and proctiger as in Figs 66–68; ♀ genital segment conical, proctiger slightly attenuate apically, anal pore with a double ring of wax-producing cells, ovipositor valves smooth.

Measurements (6 ♂, 3 ♀). Maximum width of head, ♂ 0·91–0·95, ♀ 0·91–0·97; length of antennal flagellum, ♂ 0·86–0·91, ♀ 0·87–0·89; length of ultimate rostral segment, ♂ 0·16–0·17, ♀ 0·16–0·18; length of forewing, ♂ 4·13–4·37, ♀ 4·48–4·64; length of hind tibia, ♂ 0·74–0·80, ♀ 0·76–0·78.

Fifth instar larva (Figs 278, 279). Dorsal surface outline broadly oval, about 1·1 times longer than wide. Antenna with two flagellomeres. Forewing pad 2·2 mm long; narrow prothoracic sclerites present between cephaloprothorax and mesothorax, meso- and metathoracic sclerites as in Fig. 278; humeral lobe strongly extended forward and reaching beyond anterior margin of cephaloprothorax. Caudal plate about 0·6 times as long as wide; anus ventral, a short distance from posterior margin of abdomen, anus and pore ring as in Fig. 279. Pointed sectasetae forming a dense fringe along anterior margin of cephaloprothorax and caudal plate, wing buds with a sparse fringe of very short simple setae; sectasetae absent from dorsum.

HOST PLANT. Larvae and adults collected from *Bersama* sp. (Melianthaceae); the larvae cause severe leaf-rolling and distortion.

Holotype ♂, **Tanzania**: E. Usambara mts, Amani Res. Sta. 19–27.vi.1974, c. 3,000′ *Bersama* sp. (*D. Hollis*) (BMNH; dry mounted).

Paratypes. 56 ♂, 33 ♀, larvae, same data as holotype. (BMNH; slide and dry mounted, and stored in 80% ethanol).

TRICHOCHERMES Kirkaldy

Trichopsylla Thomson, 1877: 823. Type-species: *Trioza walkeri* Förster, by monotypy. [Homonym of *Trichopsylla* Kolenati, 1863.]

Trichochermes Kirkaldy, 1904: 280; Kuwayama, 1910: 54; Loginova, 1964: 473. [Replacement name for *Trichopsylla* Thomson.]

DESCRIPTION. Head, from above, narrower than mesoscutum, in profile in same plane as longitudinal axis of thorax; occipital margin sharp, occiput concave; frontal lobes of vertex well developed, median suture well defined; median ocellus visible from above, frons completely covered by genal cones; latter well developed, in parallel plane to vertex, clavate and constricted basally; antenna with a single subapical rhinarium on each of flagellomeres 2, 4, 6 and 7. Thorax, in profile, very weakly arched; pronotum clearly visible from above and not rounded down behind occiput, prothoracic suture diagonal, episternum greatly enlarged, epimeron reduced and not in contact with lateral margin of pronotum; forewing narrow elongate oval, with subacute apex, membrane with extensive brown pattern, *C+Sc* not thickened, *Rs* sinuous or arched strongly toward *M* stem, *M* branching distal to $Rs-Cu_{1a}$ line, claval suture reaching hind margin a long distance proximal to apex of Cu_{1b}; hindwing well developed, costal setae separated into groups distal to costal break; hind femur with ventral sense organs medially placed, hind tibia with apical spurs separated into two groups, hind basitarsus without spurs. Abdomen with setae on tergites 2–7 in ♂, and 3–7 in ♀; ♂ proctiger unipartite, aedeagus 2-segmented; anal pore of ♀ with a double ring of wax-producing cells.

COMMENTS. *Trichochermes* may be distinguished from other triozids by the shape of the genal cones, the flattened thorax, the patterned forewing and the sinuous or displaced *Rs* vein. The genus is similar in appearance to *Leuronota* but the latter has simple genal cones and a relatively straight *Rs*.

Four Palaearctic species, all apparently developing on different species of *Rhamnus*, and one Afrotropical species are recognised. It is doubtful if either of the two Japanese species, described by Kuwayama (1910), are true *Trichochermes* and Crawford (1919: 185) regarded them both as *Trioza* species. From Kuwayama's original description it seems that *Trichochermes bicolor* Kuwayama, 1910: 54 is identical with *Petalolyma basalis* (Walker, 1858: 275), from India, but formal synonymy cannot be established until Kuwayama's type-material has been examined.

Trichochermes insleyi Capener

(Figs 3, 69–71)

Trichochermes insleyi Capener, 1973: 59. Holotype ♀, SOUTH AFRICA: 'Rustenburg, Tvl, 15 Sept. 1971' (NCI) [not examined].

DESCRIPTION. Adult. Having generic characters given above. Medium size, head width 0·50. Integument of head, body and legs sparsely covered with long setae. Vertex pentagonal with a well-developed concavity on either side of median suture; genal cones well developed; antennal flagellum 1·22 times longer than head width; clypeus not prominent, bearing two setae. Anterior margin of pronotum angular medially; mesopraescutum about as long as wide, with arcuate anterior margin. Forewing (Fig. 69) 3·72 times longer

than wide, with mottled brown pigmentation over whole membrane, veins densely long-haired, *Rs* arched strongly toward *M*, m_1 cell value 1·31, cu_1 cell value 0·45; hindwing with five setae on *C+Sc* proximal to costal break, setae distal to costal break divided into two groups; hind coxa with a well-developed meracanthus and incipient anterior lobe; hind tibia with a well-developed basal spine, with one outer and two inner apical spurs. ♂ proctiger narrow, lateral margins not expanded, genitalia as in Figs 70, 71; ♀ genital segment short, conical, ventral valves of ovipositor serrate at extreme apices.

Measurements (1 ♀). Maximum width of head, 0·5; length of antennal flagellum, 0·61; length of ultimate rostral segment, 0·11; length of forewing, 2·97; length of hind tibia, 0·56.

Fifth instar larva. See Capener, 1973: 60, figs 122, 123.

HOST PLANT. Larvae and adults collected from *Ziziphus mucronata* (Rhamnaceae).

DISTRIBUTION AND MATERIAL EXAMINED. Known only from the type-series of which 1 ♂ and 2 ♀ paratypes (BMNH) have been examined.

PAUROPSYLLA Rübsaamen

Pauropsylla Rübsaamen, 1899: 262; Kieffer, 1905: 167; Crawford, 1915: 258, partim; Crawford, 1919: 142, partim; Enderlein, 1921: 115, partim; Loginova, 1972*a*: 839; Mathur, 1975: 72 partim. Type-species: *Pauropsylla udei* Rübsaamen, by monotypy.

Sympauropsylla Enderlein, 1921: 116. Type-species: *Pauropsylla triozoptera* Crawford, by original designation. **Syn. n.**

DESCRIPTION. Head, from above, as wide as mesoscutum, in profile inclined almost at 90° to longitudinal axis of body; vertex pentagonal, with sharp occipital margin medially, rounded down anteriorly to genae, median suture weak or absent, dorsal depressions well developed, lateral ocelli placed on outer surfaces of raised tubercles, median ocellus visible from above; frons visible from anterior view; genae rounded, sometimes weakly expanded laterally below eyes; latter prominent, rounded; antenna short, with 8 or, more rarely, 6 flagellomeres. Thorax strongly arched dorsally; pronotum just visible from above, strongly rounded down below anterior margin of mesopraescutum and behind occiput, propleural suture diagonal with epimeron reduced and not in contact with lateral margin of pronotum; mesopraescutum, from above, with broadly arcuate anterior margin, in profile anterior margin sharply rounded down to pronotum; forewing obovate with narrow proximal part, not more than 2·3 times longer than wide, a very short *M+Cu* stem often present, *M* branches distally to $Rs-Cu_{1a}$ line, m_1 cell value less than 1, *Cu* stem always more than twice as long as Cu_{1b}, wing membrane devoid of spinules except for radular areas; hindwing at least two-thirds as long as forewing; legs slightly elongate, meracanthus present on hind coxa, hind femur narrow with ventral sense organs medial, hind tibia elongate with a group of small weak spines basally and one outer and two inner spurs apically (2 + 2 in *P. udei*), hind basitarsus without apical spurs. Abdomen with setae on tergites 2 and 3 in ♂, and 3 and 4 in ♀; ♂ proctiger unipartite, mostly simple, flask-shaped, basal part rarely expanded; anal pore of ♀ normally with a double ring of wax-producing cells.

COMMENTS. *Pauropsylla* may be distinguished from other triozid genera by the shape and venation of the forewing (Figs 75, 80, 83, 84, 86).

The most recent and comprehensive review of psyllid systematics (Bekker-Migdisova, 1973) places *Pauropsylla* in the tribe Pauropsyllini, together with the Microceropsyllini, in the subfamily Pauropsyllinae and in the family Carsidaridae. This largely follows Klimaszewski (1964) rather than Heslop-Harrison (1958) who placed the genus within his diffuse group the Ciriacreminae (see Hollis, 1976).

In a recent revision of the Pauropsyllini, Loginova (1972*a*) concludes that the group is closely related to the Phacopteronini and contains the genera *Pauropsylla, Sympauropsylla, Leptynoptera, Microceropsylla, Pelmatobrachia* and *Paurocephala*. Including *Paurocephala* in this group is consistent with Crawford's (1915; 1919) interpretation, but other workers (Vondráček, 1957; Heslop-Harrison, 1958; Klimaszewski, 1964) disagreed with this and placed *Paurocephala* in the Aphalaridae. After examining several species of *Paurocephala*, including the type-species, *P. psylloptera* Crawford, the structure of the adult head, thorax and wing venation, and the 5th instar larva (Table 3) suggest this genus should be placed in the Aphalaridae close to the genera *Haplaphalara* and *Moraniella*. Of the five remaining genera in Loginova's (1972*a*) Pauropsyllini, *Microceropsylla* and *Pelmatobrachia* (Bekker-Migdisova's 1973 Microceropsyllini) are transferred to the Calophyinae; *Sympauropsylla* is synonymised with *Pauropsylla* which, together with

Leptynoptera, is transferred to the Triozidae. Following Klimaszewski (1964) the Phacopteronini is placed in the Aphalaridae.

Mathur (1975), in his account of Indian psyllids, reviews the Pauropsyllinae (auctt.) and includes four genera, *Apsylla, Paurocephala, Pauropsylla* and *Phacopteron*. *Apsylla* was placed in the Anomalopsyllini by Vondráček (1963) and into the Aphalaridae by Klimaszewski (1964). Of the species Mathur included in *Paurocephala* only *minuta* Crawford, *psylloptera* Crawford, *phalaki* Mathur and *russellae* Mathur should remain in that genus. *P. menoni* Mathur and *trimaculata* Mathur are here transferred to *Haplaphalara* as *H. menoni* (Mathur, 1975) **comb. n.**, and *H. trimaculata* (Mathur, 1975) **comb. n**. Of the 14 species Mathur placed in *Pauropsylla, depressa* Crawford, *ficicola* Kieffer, *globuli* Kieffer, *purpurescens* Mathur and *reticulata* Mathur should remain. *P. brevicornis* (Crawford) and *nigra* (Crawford) were placed in *Microceropsylla* by Boselli (1930*a*); *longispiculata* Mathur, *maculata* Mathur and *verrucosa* Mathur are here transferred to *Microceropsylla* as *M. longispiculata* (Mathur, 1975) **comb. n**. *M. maculata* (Mathur, 1975) **comb. n**. and *M. verrucosa* (Mathur, 1975) **comb. n**. *P. spondiasae* (Crawford) was placed in *Pelmatobrachia* by Enderlein (1921), and *tuberculata* (Crawford) was placed in *Pseudophacopteron*, also by Enderlein (1921). *P. beesoni* Laing is here transferred to *Trioza* as *T. beesoni* (Laing, 1930) **comb. n**. *P. stevensi* Laing is here transferred to the genus *Diceraeopsylla* as *D. stevensi* (Laing, 1930) **comb. n**., and the genus is referred to the Aphalaridae.

The description and figures of *Pauropsylla shiwapuriensis* Miyatake (1981: 53) show that this species is wrongly assigned and, more likely, belongs in the Aphalaridae near the *Haplaphalara*/*Diclidophlebia*-group.

Most *Pauropsylla* species are recorded from species of *Ficus* (Moraceae) although *udei*, the type-species, was described from a member of the Rubiaceae. Uichanco (1921: 265) regards this host record as a misidentification but Mathur (1975: 105) has described *reticulata* from *Anthocephalus indicus* (Rubiaceae). I have examined specimens from the same sample as the type-series of *reticulata* and suspect that this species is synonymous with *udei*. Further material, including larvae, from *Anthocephalus indicus* will be needed before this synonymy and host plant record can be confirmed.

Eleven described species are regarded here as congeneric in *Pauropsylla*, mainly from the

Table 3 Comparison of morphological features and host plant preferences of *Paurocephala* species and *Pauropsylla* species.

	Paurocephala	*Pauropsylla*
Adults	In profile, head inserted at or below anterior margin of pronotum.	Pronotum strongly rounded down behind occiput so that, in profile, it is below dorsal margin of head.
	From above, dorsum of thorax broad.	From above, dorsum of thorax narrow.
	Forewing with costal break, pterostigma clearly defined, long *M+Cu* stem present, apex of claval suture adjacent to apex of Cu_{1b}.	Forewing without costal break and pterostigma, *M+Cu* stem very short or absent, apex of claval suture distant from apex of Cu_{1b}.
Larvae	Free-living; dorsal sclerites of thorax separate; sectasetae present on antenna.	Gall-forming; dorsal thoracic sclerites fused to form a single plate (except in *proxima* sp.n.) sectasetae absent from antenna.
Host plants	Malvales and Urticales (Moraceae, Ulmaceae, Tiliaceae, Malvaceae and Sterculiaceae).	*Ficus* spp. (Moraceae), and possibly Rubiaceae.

Oriental region, but two species of doubtful validity, *nussex* Carmin and *biki* Carmin, occur in the Palaearctic Region. *P. willcocksi* and *trichaeta* occur in Africa and a further eleven Afrotropical species are described below. They may be identified using couplets 39–50 in the key (p. 20).

The *willcocksi*-group

Defined by the presence of a strong ventroapical spur on the fore coxa. Three species with an Afrotropical distribution belong in this group, *willcocksi, trichaeta* and *tatrichea*. Two poorly described species from Palestine also belong here (see comment under *willcocksi*).

Pauropsylla willcocksi Dçbski

(Figs 72–74, 280, 281)

Pauropsylla willcocksi Dçbski, 1918 [?1923]: 14; Willcocks, 1922: 275; Samy, 1972: 458. Syntypes, ♂s, ♀s, larvae, EGYPT [not traced].

[*Pauropsylla trichaeta* Pettey; Awadallah & Swailem, 1971: 193;? Loginova, 1972*a*: figs 40, 41. Misidentifications.]

DESCRIPTION. Adult. Having generic characters given above. Integument shiny, sparsely covered with very short setae. Median suture of vertex absent; antenna with eight flagellomeres, flagellum 1·34–1·61 times longer than head width, apical flagellomere with one long and one moderately long and truncate terminal seta; clypeus bearing several hairs, ultimate rostral segment bearing a long basal pair and a short subapical pair of setae. Forewing 1·92–2·06 times longer than wide, veins very sparsely clothed with very short setae, m_1 cell value 0·79–0·99, cu_1 cell value 1·15–1·69; costal margin of hindwing with 1–2 setae proximal to costal break, setae distal to costal break clearly divided into two groups; forecoxa with a well-developed ventroapical spur; tarsal segments subequal. ♂ proctiger flask-shaped with weak basal expansions, the inner surface of each expansion bearing up to 22 thickened peg-like setae (Fig. 72); paramere and aedeagus as in Figs 73, 77 (*trichaeta*); ♀ genital segment short, triangular in profile, subgenital plate with a ventral transverse groove in apical third.

Measurements (10 ♂, 10 ♀). Maximum width of head, ♂ 0·44–0·51, ♀ 0·46–0·57; length of antennal flagellum, ♂ and ♀, 0·65–0·80; length of ultimate rostral segment, ♂ 0·07–0·10, ♀ 0·09–0·11; length of forewing, ♂ 1·75–2·15, ♀ 2·07–2·55; length of hind tibia, ♂ 0·51–0·67, ♀ 0·56–0·71.

Fifth instar larva (Figs 280, 281). Dorsal surface outline broadly oval, about 1·3 times longer than wide. Antennal flagellum unsegmented. Cephalothorax entire. Forewing pad about 0·47 mm long, humeral lobe extending forward but not as far as anterior margin of eye. Caudal plate about 0·6 times as long as wide, anus ventral and distant from posterior margin of abdomen, anus and pore ring as in Fig. 281. Marginal fringe consisting of moderately dense truncate sectasetae of varying lengths; postocular truncate sectasetae present; dorsum sparsely covered with truncate sectasetae.

HOST PLANTS. Adults and larvae collected from *Ficus ?gnaphalocarpa* and *Ficus* sp. in Senegal, and *Ficus sycomorus* in Egypt (Moraceae). The larvae live in pit-galls on the undersides of the leaves.

DISTRIBUTION. Material has been examined from Cape Verde Is., Senegal, Egypt, Sudan and Saudi Arabia.

COMMENTS. *Pauropsylla willcocksi* is very close to *P. trichaeta*. Adults of the two species appear to be almost indistinguishable, but males of *trichaeta* tend to have more peg-like setae on the inner surface of the lateral expansions of the proctiger (25–30 on each side as opposed to a maximum of 22 on each side in *willcocksi*). However, the larvae of the two species appear to be quite distinct (see Figs 280, 282).

Carmin (1951: 1–3) described two species, *P. nussex* and *P. bikii*, from Palestine, but the descriptions are not diagnostic from one another or from *willcocksi* and the type-material is apparently lost. In the BMNH collection are several adult specimens labelled 'Palestine, Drs. D. Scheinkin and J. Carmin, on *Ficus sycamorus*', some bear the number S.108, others S.109. If these specimens are not part of the original syntypic series of *nussex* and *bikii* they certainly represent Carmin's two species. This material is indistinguishable from *willcocksi*. Recently

collected *Pauropsylla* specimens from Israel (Bet Dagan) on *Ficus sycomorus*, consisting of adults and larvae, do not resolve the problem. The adults are not distinguishable from *willcocksi* but the larvae are distinct from both *willcocksi* and *trichaeta*. They have the narrower dorsal surface outline and uneven marginal fringe of *willcocksi*, but lack sectasetae on the dorsal surface, as in *trichaeta*.

Thus we have a series of populations of *Pauropsylla* species from South Africa, throughout Africa and extending into the Middle East. The adults of these populations are morphologically very similar but three distinct forms of larvae can be identified, and names are available for these three larval types. I have therefore decided to name those populations from Africa, south of the Sahara, on *Ficus sur* (= *F. capensis*) and *Ficus* spp. as *P. trichaeta*; those populations from Senegal, North Africa, Saudi Arabia and Cape Verde Is. on *Ficus sycomorus* and *F. gnaphalocarpa* (H. C. D. de Wit in a personal communication, suggests these two species may be synonymous) as *P. willcocksi*; and the Palestinian populations on *F. sycomorus*, as either *P. nussex* or *bikii* or both.

Pauropsylla trichaeta Pettey

(Figs 4, 45, 75–78, 282)

Pauropsylla trichaeta Pettey, 1924: 29; 1925: 137; Capener, 1970: 199. Holotype (? sex), South Africa: 'Tanzeen, Transvaal, on a native fig tree, associated with galls' (SAM) [not examined].

Description. Adult. Similar in most features to *P. willcocksi*. Differs in that 25–30 peg-like setae are present on inner surface of each lateral expansion of the ♂ proctiger (Fig. 76).

Measurements (10 ♂, 10 ♀). Maximum width of head, ♂ 0·40–0·51, ♀ 0·44–0·56; length of antennal flagellum, ♂ 0·67–0·80, ♀ 0·63–0·80; length of ultimate rostral segment, ♂ 0·07–0·09, ♀ 0·08–0·11; length of forewing, ♂ 1·83–2·31, ♀ 2·12–2·77; length of hind tibia, ♂ 0·50–0·67, ♀ 0·53–0·69.

Fifth instar larva (Fig. 282). Dorsal surface outline almost circular, about 1·2 times longer than wide. Antennal flagellum unsegmented. Cephalothorax entire. Forewing pad 0·64 mm long, humeral lobe extending forward but not reaching anterior margin of eye. Caudal plate about half as long as wide, anus ventral and distant from posterior margin of abdomen, anus and pore ring as in *willcocksi* (Fig. 281). Truncate tubular sectasetae forming an even dense marginal fringe, postocular tubular sectaseta present, sectasetae absent from dorsum.

Host plants. Adults and larvae collected from *Ficus sur* (= *F. capensis*), *Ficus* spp. (Moraceae). The larvae from pit-galls on the undersides of the leaves.

Distribution. Material has been examined from South Africa, Mozambique, Zimbabwe, Angola, Tanzania, Kenya, Uganda, Sudan, Cameroun, Nigeria, Ghana, Ivory Coast, Sierra Leone and Senegal.

Comment. See under *P. willcocksi*.

Pauropsylla tatrichea **sp. n.**

(Fig. 79)

Description. Adult. Very similar to *P. willcocksi* but larger. Clypeus with a pair of setae, ultimate rostral segment with a pair of small setae subapically. Costal margin of hindwing with 3–4 setae proximal to costal break. ♀ genital segment (Fig. 79) rounded triangular in profile, subgenital plate without ventral transverse groove. ♂ unknown.

Measurements (3 ♀). Maximum width of head, ♀ 0·55–0·57; length of antennal flagellum, ♀ 0·79–0·88; length of ultimate rostral segment, ♀ 0·09; length of forewing, ♀ 2·77–3·08; length of hind tibia, ♀ 0·65–0·70.

Larva and host plant unknown.

Holotype ♀, **Cameroun**: Bamenda, 6.ii.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Cameroun**: 1 ♀, same data as holotype. **Ivory Coast**: 1 ♀, 24.iv.1969 (*A. Pollet*). (BMNH; slide mounted.)

The *trigemma*-group

Defined by having highly modified antennae which are reduced in length, some of the flagellomeres bearing double rhinaria with bifid sensilla; anal pore of ♀ with an incomplete outer ring of wax-producing cells. Three species are included: *trigemma, ngongae* and *breviantennata*.

Pauropsylla trigemma sp. n.

(Figs 11, 80–82)

Description. Adult. Integument with a dense covering of short setae. Median suture of vertex present and complete; antennal flagellum (Fig. 11) very short, 0·84–0·88 times as long as head width, flagellomere 2 with a single rhinarium bearing a very short bifid sensillum, flagellomeres 4 and 6 each with a pair of rhinaria and each of these bears a long bifid sensillum, flagellomere 7 with a single rhinarium which bears a bifid sensillum of moderate length, both terminal setae on apical flagellomere long; clypeus with a pair of setae, ultimate rostral segment without setae. Forewing (Fig. 80) 2·24–2·26 times longer than wide, veins bearing short setae, m_1 cell value 0·94–1·04; fore coxa without a ventroapical spur; tarsal segments subequal. ♂ proctiger narrow tubular, without lateral expansions or thickened setae, paramere and aedeagus as in Figs 81, 82; ♀ unknown.

Measurements (2 ♂). Maximum width of head, 0·48–0·55; length of antennal flagellum, 0·42–0·46; length of ultimate rostral segment, 0·06–0·08; length of forewing, 1·82–1·91; length of hind tibia, 0·32–0·39.

Larva and host plant unknown.

Holotype ♂, **Angola**: Bruco, 26.ii.–2.iii.1972, at light (*D. Hollis*) (BMNH; slide mounted).

Paratype. **Tanzania**: 1 ♂, Kilimanjaro, Bismark Hut, 2,500–3,000 m, S. Mawenzi, at foot of high pasture, ii.1912 (*Chr. Schröder*) (MNHU; slide mounted).

Comments. *P. trigemma* and *ngongae* are regarded as sister-species. They may be separated from one another by the shape of the forewing and the chaetotaxy of the forewing veins. Both species form the sister-group of *breviantennata*.

Pauropsylla ngongae sp. n.

(Figs 29, 83)

Description. Adult. Very similar to *trigemma*. Integument covered with long setae. Antennal flagellum 0·77 times as long as head width, flagellomere 7 (Fig. 29) with a supplementary long conical sensillum adjacent to rhinarium. Forewing (Fig. 83) 1·79 times longer than wide, veins bearing long setae in proximal two-thirds of wing. ♂ unknown. ♀ genital segment short, triangular in profile; subgenital plate with a truncate posterior margin which bears long setae, inner fold connecting ventral ovipositor valve sclerotised and extended as a triangular projection beyond posterior margin of subgenital plate.

Measurements (1 ♀). Maximum width of head, 0·48; length of antennal flagellum, 0·37; length of ultimate rostral segment, 0·05; length of forewing, 1·75; length of hind tibia, 0·46.

Larva and host plant unknown.

Holotype ♀, **Kenya**: Nairobi, junc. Magadi-Langata Rd, *c.* 5,400′, 26.vii.1974 (*D. Hollis*) (BMNH; dry mounted).

Paratypes. 2 ♀, same data as holotype (BMNH; slide and dry mounted).

Comment. See under *P. trigemma*.

Pauropsylla breviantennata sp. n.

(Figs 12, 84, 85)

Description. Adult. Similar to *P. trigemma*. Integument covered with short setae. Median suture of vertex weak and incomplete towards occipital margin; antennal flagellum (Fig. 12) 6-segmented, 0·76–0·84, times as long as head width, two rhinaria present apically on flagellomeres 2, 3 and 4, a single rhinarium present on flagellomere 5, rhinaria of flagellomeres 2, 3 and 5 bear large bulbous sensillae, rhinaria of flagellomere 4 bear bifid sensillae, rhinarium of flagellomere 5 with an associated conical sensillum, terminal setae of apical flagellomere of equal length, very long, about 0·75 times as long as whole flagellum. ♂ proctiger,

paramere and aedeagus as in Fig. 85; ♀ genital segment damaged in specimen available, posterior margins of both proctiger and subgenital plate densely clothed with long setae.

Measurements (1 ♂, 1 ♀). Maximum width of head, ♂ 0·37, ♀ 0·42; length of antennal flagellum , ♂ 0·31, ♀ 0·32; length of ultimate rostral segment, ♀ 0·04; length of forewing, ♂ 1·13, ♀ 1·32; length of hind tibia, ♂ 0·36, ♀ 0·34.

Larva and host plant unknown.

Holotype, ♂ **Ghana**: Tafo, 29.v.1957 (*V. F. Eastop*) (BMNH; slide mounted).

Paratype. **Nigeria**: 1 ♀, Mokwa, 6–12.ix.1964, Moericke bowl (*J. A'Brook*) (BMNH; slide mounted).

Comments. *P. breviantennata* is regarded as the sister-species of both *trigemma* and *ngongae*. It differs from both of these in that the antennal flagellum is even more reduced with the loss of flagellomeres 3 and 5, these being the non-rhinarium-bearing flagellomeres of the primitive antenna. In all three species, congruent with the reduction in length of the antenna, is the development of complex rhinaria and lengthening of the terminal setae.

The *septima*-group

Defined by the complex form of the apical segment of the aedeagus and the emarginate posterior margin of the female subgenital plate. Two species are included: *P. septima* and *P. proxima*.

Pauropsylla septima sp. n.

(Figs 86–89)

Description. Adult. Integument sparsely covered with short setae. Median suture of vertex present; antennal flagellum 1·14–1·40 times longer than head width, rhinaria simple, apical flagellomere with one long and one short and truncate terminal seta; clypeus with a pair of setae, ultimate rostral segment with a pair of short setae. Forewing (Fig. 86) 2·00–2·25 times longer than wide, veins very sparsely clothed with short setae; forecoxa without ventroapical spur; tarsal segments subequal. ♂ proctiger flask-shaped, with patches of fine setae on inner surfaces of lateral expansions; paramere and aedeagus as in Figs 87, 88, latter with complex apical segment; ♀ genital segment rounded triangular in profile, posterior margin of subgenital plate with a small emargination and bordered with short setae (Fig. 89).

Measurements (8 ♂, 7 ♀). Maximum width of head, ♂ 0·42–0·47, ♀ 0·43–0·49; length of antennal flagellum, ♂ 0·54–0·61, ♀ 0·55–0·61; length of ultimate rostral segment, ♂ and ♀, 0·06–0·07; length of forewing, ♂ 1·87–2·13, ♀ 2·16–2·49; length of hind tibia, ♂ 0·48–0·58, ♀ 0·52–0·58.

Larva and host plant unknown.

Holotype ♂, **Cameroun**: Bamenda, 20–24.i.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Cameroun**: 3 ♂, 2 ♀, same data as holotype; 17 ♂, 11 ♀, 25.i.–6.ii.1957 (*V. F. Eastop*) (BMNH; slide mounted and stored in Berlese fluid).

Comment. *P. septima* and *proxima* are regarded as sister species and may be distinguished from one another by the form of the male paramere (Figs 87, 90) and the female subgenital plate (Figs 89, 92).

Pauropsylla proxima sp. n.

(Figs 90–92, 283, 284)

Description. Adult. Very similar to *septima*. Differs in the shape of the ♂ paramere (Fig. 90), and the deeply emarginate and long-haired posterior margin of the ♀ subgenital plate (Fig. 92).

Measurements (10 ♂, 10 ♀). Maximum width of head, ♂ 0·46–0·53, ♀ 0·50–0·53; length of antennal flagellum, ♂ 0·59–0·73, ♀ 0·63–0·72; length of ultimate rostral segment, ♂ 0·07, ♀ 0·07–0·08; length of forewing, ♂ 2·09–2·24, ♀ 2·32–2·49; length of hind tibia, ♂ 0·53–0·59, ♀ 0·54–0·61.

Fourth instar larva (Figs 283, 284). No 5th instar larvae available for study. Dorsal surface outline oval with clearly defined head, thorax and abdomen, about 1·5 times longer than wide. Small prothoracic sclerites present behind cephaloprothorax, arrangement of sclerites of rest of thorax as in Fig. 283; humeral lobe of forewing bud not developed. Caudal plate excludes first four abdominal segments; anus ventral, pore ring complex (Fig. 284). Sectasetae absent from margin of cephaloprothorax, pointed sectasetae present on margins of wing buds and abdomen, dorsal surface of abdomen with a dense covering of lanceolate setae.

HOST PLANT. Adults and larvae collected from *Ficus* sp., and adults only collected from *Ficus thonningii* (Moraceae).

Holotype ♂, **Cameroun**: Bamenda, 25–31.i.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Cameroun**: 6 ♂, 15 ♀, same data as holotype; numerous ♂ and ♀, 20–24.i.1957 and 1–6.ii.1957. **Angola**: 3 ♂, 7 ♀, larvae, Chianga, 10.x.1970, *Ficus* sp.; 4 ♂, 3 ♀, 7.x.1971, *Ficus thonningii* (*A. van Harten*). **Nigeria**: 4 ♂, Zaria, 28.ii.1956, yellow tray (*V. F. Eastop*). (BMNH; slide and dry mounted, and stored in Berlese fluid.)

COMMENT. See under *P. septima*.

Ungrouped species

Pauropsylla angolensis sp. n.

(Figs 93, 94)

DESCRIPTION. Adult. Similar to *senegalensis* (p. 34) but larger. Median suture of vertex weak but complete; antennal flagellum 1·13–1·17 times longer than head width; clypeus with two pairs of setae. Forewing 1·99–2·09 times longer than wide. ♂ proctiger with very weakly expanded lateral lobes; paramere and aedeagus as in Figs 93, 94; ♀ genital segment short, rounded triangular in profile; posterior margin of subgenital plate truncate.

Measurements (2 ♂, 1 ♀). Maximum width of head, ♂ 0·60–0·64, ♀ 0·63; length of antennal flagellum, ♂ 0·72, ♀ 0·74; length of ultimate rostral segment, ♂ 0·07, ♀ 0·08; length of forewing, ♂ 2·80, ♀ 3·03; length of hind tibia, ♂ 0·78–0·79, ♀ 0·88.

Larva and host plant unknown.

Holotype ♂, **Angola**: 3 mls SW. Salazar, 15.iii.1972, at light (*D Hollis*) (BMNH; dry mounted).

Paratypes. 4 ♂, 1 ♀, same data as holotype (BMNH; slide and dry mounted).

Pauropsylla eastopi sp. n.

(Figs 95–97)

DESCRIPTION. Adult. Integument shiny, sparsely covered with short setae. Median suture of vertex present; antennal flagellum 1·24–1·45 times longer than head width, rhinaria simple, apical flagellomere with subequal terminal setae; clypeus with several short setae; ultimate rostral segment without setae. Forewing 2·08–2·26 times longer than wide, veins very sparsely clothed with short setae, m_1 cell value 0·86–0·98; forecoxa without ventroapical spur; tarsal segments subequal. ♂ proctiger (Fig. 97) with greatly enlarged lateral expansions which do not bear peg-like setae, paramere and aedeagus as in Figs 95, 96; ♀ genital segment very short triangular in profile, sternite 6 of abdomen very weakly sclerotised ventrally, membrane between tergite 8 and proctiger with lateral glandular areas.

Measurements (7 ♂, 7 ♀). Maximum width of head, ♂ 0·47–0·50, ♀ 0·49–0·51; length of antennal flagellum, ♂ 0·65–0·71, ♀ 0·62–0·65; length of ultimate rostral segment, ♂ and ♀ 0·06–0·07; length of forewing, ♂ 2·25–2·40, ♀ 2·43–2·61; length of hind tibia, ♂ 0·55–0·60, ♀ 0·57–0·60.

Larva and host plant unknown.

Holotype ♂, **Cameroun**: Bamenda, 1–5.ii.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Cameroun**: numerous ♂ and ♀, same data as holotype; numerous ♂ and ♀, 20–31.i.1957 and 6.ii.1957 (*V. F. Eastop*) (BMNH; slide and dry mounted, and stored in Berlese fluid).

COMMENTS. This species is easily distinguished from all other known *Pauropsylla* species by the form of the male proctiger and genitalia (Figs 95–97), and the lack of sclerotisation of the female abdominal sternite 6. I can find no other characters which will relate it more closely to other species-groups within the genus.

Pauropsylla longipes sp. n.

(Figs 98–101, 287, 288)

DESCRIPTION. Adult. Integument granular, sparsely covered with short setae. Median suture of vertex absent; antennal flagellum 1·41–1·78 times longer than head width, rhinaria simple, apical flagellomere with one long and one moderately long truncate seta terminally; clypeus with a pair of setae, ultimate

rostral segment with 2–4 pairs of setae. Forewing 2·05–2·26 times longer than wide, veins very sparsely clothed with short setae, m_1 cell value 0·77–1·05; costal margin of hindwing with 2–4 setae proximal to costal break; forecoxa without ventroapical spur; basitarsal segments 1·5 times as long as apical segments of tarsi. ♂ proctiger with a small group of up to 12 peg-like setae on the inner surface of each lateral expansion (Fig. 100), paramere and aedeagus as in Figs 98, 99; ♀ genital segment (Fig. 101) elongate triangular in profile, subgenital plate without ventral transverse groove.

Measurements (9 ♂, 7 ♀). Maximum width of head, ♂ 0·43–0·50, ♀ 0·43–0·52; length of antennal flagellum, ♂ 0·68–0·94, ♀ 0·66–0·80; length of ultimate rostral segment, ♂ 0·08–0·10, ♀ 0·09–0·10; length of forewing, ♂ 1·94–2·24, ♀ 1·91–2·47; length of hind tibia, ♂ 0·63–0·78, ♀ 0·67–0·81.

Fifth instar larva (Figs 287, 288). Dorsal surface outline elongate oval with a clear indentation on either side at base of abdomen, and a posteromedian prolongation, about twice as long as wide (including prolongation). Antenna with three flagellomeres. Cephalothorax entire, posterior margin serrate; forewing pad 0·52 mm long, humeral lobes weakly produced forward but not reaching hind margin of eye. Caudal plate about 1·3 times longer than wide (including prolongation); anus ventral and distant from posterior margin of abdomen, anus and pore ring as in Fig. 288. Small narrow tubular sectasetae form a sparse fringe on head and wing buds; both large and small tubular sectasetae form an uneven fringe around abdomen; a simple postocular seta present; sectasetae on dorsum as in Fig. 287.

HOST PLANT. Adults and larvae collected from *Ficus* sp. (Moraceae).

Holotype ♂, **Tanzania**: S. Pare mtns, hillside above Gonja, *c.* 3,000′, 12–16.vi.1974, *Ficus* sp. (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Tanzania**: 18 ♂, 7 ♀, same data as holotype; 21 ♂, 19 ♀, larvae, E. Usambara mtns, Amani-Muheza Rd, below Kiswani, *c.* 2,000′, 21–24.vi.1974, *Ficus* sp. (*D. Hollis*). **Cameroun**: 5 ♂, 6 ♀, Bamenda, 24.i.–6.ii.1957, yellow tray (*V. F. Eastop*). **Nigeria**: 1 ♀, W. State, Ile-Ife, 6.ix.1971 (*J. T. Medler*). **Ghana**: 2 ♂, Tafo (*B. N. Gerrard*); 7 ♂, 12 ♀, 15.v.1957; 15 ♂, 15 ♀, vi.1957 (*V. F. Eastop*). (BMNH; slide and dry mounted, and stored in Berlese fluid.)

COMMENTS. This species resembles those of the *willcocksi*-group in lacking a median suture on the vertex and having peg-like setae on the inner surfaces of the lateral expansions of the male proctiger, but differs in lacking a ventroapical spur on the forecoxa. It is readily distinguished from other Afrotropical *Pauropsylla* species by the proportions of the tarsal segments.

Pauropsylla mistura sp. n.

(Figs 102–104)

DESCRIPTION. Adult. Very similar to *senegalensis* (p. 34) but larger. Median suture of vertex present and complete; antennal flagellum 1·15–1·31 times longer than head width. Forewing 2·21–2·30 times longer than wide. ♂ proctiger with very weak lateral expansions, paramere and aedeagus as in Figs 102, 103; ♀ genital segment short, rounded triangular in profile (Fig. 104), ventral margin of subgenital plate rounded in profile.

Measurements (3 ♂, 6 ♀). Maximum width of head, ♂ 0·50–0·51, ♀ 0·51–0·53; length of antennal flagellum, ♂ 0·62–0·64, ♀ 0·61–0·67; length of ultimate rostral segment, ♂ 0·07, ♀ 0·07–0·08; length of forewing, ♂ 2·49–2·64, ♀ 2·58–2·78; length of hind tibia, ♂ 0·58–0·60, ♀ 0·59–0·66.

Larva and host plant unknown.

Holotype ♂, **Cameroun**: Bamenda, 20–24.i.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Cameroun**: 1 ♀, same data as holotype; 1 ♂, 3 ♀, 25.i.–5.ii.1957. **Nigeria**: 1 ♂, 1 ♀, Samaru, viii.1956; 1 ♀, Jos, 25–26.xi.1956, yellow tray (*V. F. Eastop*). **Ghana**: 1 ♀, Tafo, v.1957 (*V. F. Eastop*). (BMNH; slide mounted.)

COMMENTS. *P. mistura* is larger than *senegalensis*, has the male paramere and aedeagus of a different shape, and a rounded conical female genital segment. It may be separated from *angolensis* on the form of the male genitalia.

Pauropsylla senegalensis sp. n.

(Figs 105–108, 285, 286)

DESCRIPTION. Adult. Integument granular, sparsely covered with very short setae. Median suture of vertex weak, evanescing before reaching occiput; antennal flagellum 1·06–1·27 times longer than head width,

rhinaria simple, apical flagellomere with one long and one short and truncate seta; clypeus with a pair of setae, ultimate rostral segment without setae. Forewing 1·91–2·03 times longer than wide, veins very sparsely clothed with short setae, m_1 cell value 0·69–0·91. Forecoxa without ventroapical spur; tarsal segments subequal. ♂ proctiger (Fig. 107) flask-shaped, with weak lateral expansions which bear simple setae on their inner surfaces, paramere and aedeagus as in Figs 105, 106; ♀ genital segment (Fig. 108) short, subrectangular in profile, proctiger with a weak transverse groove posterior to anal pore, subgenital plate with a narrowly arcuate posterior margin, ventral margin subangular in profile.

Measurements (7 ♂, 4 ♀). Maximum width of head, ♂ 0·45–0·48, ♀ 0·48–0·50; length of antennal flagellum, ♂ 0·54–0·61, ♀ 0·51–0·58; length of ultimate rostral segment, ♂ and ♀ 0·06–0·07; length of forewing, ♂ 1·75–1·87, ♀ 1·93–2·09; length of hind tibia, ♂ 0·50–0·54, ♀ 0·54–0·56.

Fifth instar larva (Figs 285, 286). Dorsal surface outline broadly oval, about 1·2 times longer than wide. Antenna with two flagellomeres. Cephalothorax entire; forewing pad 0·65 mm long, humeral lobe extending forward as far as anterior margin of eye. Caudal plate about 0·6 times as long as wide, anus ventral and distant from posterior margin of abdomen, anus and pore ring as in Fig. 286. Truncate tubular sectasetae forming an even dense fringe; postocular seta absent, sectasetae absent from dorsum.

HOST PLANT. Adults and larvae collected from *Ficus* sp. (Moraceae).

Holotype ♂, **Senegal**: Simbandi-Balante, 18.vi.1981, *Ficus* sp. (*J. Etienne*) (BMNH; dry mounted).

Paratypes. Numerous adults and larvae, same data as holotype (BMNH; MNHN; slide and dry mounted, and stored in 80% ethanol).

COMMENTS. This species is very similar to *mistura* and *angolensis*, but it may be distinguished from these by its smaller size, the incomplete median suture of the vertex and the form of the male and female genitalia (Figs 105–108).

TRIOZA Foerster

Trioza Foerster, 1848: 67. Type-species: *Chermes urticae* Linnaeus, by subsequent designation of Oshanin, 1912: 128.

Powellia Maskell, 1879: 223. Type-species: *Powellia vitreoradiata* Maskell, by monotypy. [Synonymised by Maskell, 1890: 167.]

Phylloplecta Riley, 1884: 319. Type-species: *Psylla tripunctata* Fitch, by monotypy. [Synonymised by Tuthill, 1943: 546.]

Phyllopecta Ferris, 1926: 16. [Misspelling of *Phylloplecta* Riley; Tuthill, 1943: 546.]

Spanioza Enderlein, 1926: 400. Type-species: *Trioza galii* Foerster, by original designation. [Synonymised by Tuthill, 1943: 546.]

Colopelma Enderlein, 1926: 400. Type-species: *Trioza thomasii* Löw, by original designation. [Synonymised by Tuthill, 1943: 546.]

Siphonaleyrodes Takahashi, 1932: 48. Type-species: *Siphonaleyrodes formosanus* Takahashi, by original designation. [Synonymised by Mound & Halsey, 1978: 252.]

Only established synonymy is stated above but the following references, given under the synonymy of the family Triozidae (p. 8), contain regional revisions of *Trioza:* Vondráček, 1957 (Czechoslovakia); Ramirez-Gomez, 1960 (Spain); Dobreanu & Manolache, 1962 (Rumania); Loginova, 1964 (European U.S.S.R.); Klimaszewski, 1973 (Palaearctic check-list); 1975 (Poland); Sulc, 1910; 1911; 1912; 1913 (revision of Palaearctic species); Crawford, 1919 (Oriental, Australo-oriental and Pacific); Mathur, 1975 (India); Froggatt, 1901 (Australia); Tuthill, 1952 (New Zealand); Zimmermann, 1948 (Hawaii); Crawford, 1914 (New World); Tuthill, 1943 (N. America); 1944 (Mexico); 1959; 1964 (Peru).

Tuthill's argument (1943: 547) that *Phylloplecta* Riley is a nomen nudum is not accepted here as Riley's statement '*Phylloplecta tripunctata*, which crumbles the tips of blackberry' makes clear he is referring to *Psylla tripunctata* and validates *Phylloplecta* Riley, 1884 under Article 16(v) of the *International Code of Zoological Nomenclature*.

As the following species are here placed in *Trioza* on a temporary basis, a detailed description of the genus is of no systematic value. These species differ from Afrotropical species placed in other triozid genera as follows.

Median suture of vertex present and normally complete; genal cones, when present, not constricted basally. Propleural suture diagonal, episternum enlarged, epimeron reduced,

displaced ventrally and not in contact with lateral margin of pronotum. Forewing shape mostly elongate elipsoid and narrowing to a subangular apex, if with rounded apex then more than 2·3 times longer than wide (exception *T. guiera*, p. 62); radular areas present only in cells m_1, m_2 and cu_1; claval suture reaching hind margin of wing some distance from apex of Cu_{1b}. Ventral sense organs of hind femur in median position; basal tarsal segment of hind leg without apical spurs. Male proctiger unipartite.

For the species treated below the grouped species are considered before those not placed in groups. The *erytreae*-group is dealt with first as it contains the major pest species and, probably, is most closely related to the type-species. Other species-groups are treated in descending order of apparent relationship to the *erytreae*-group. The ungrouped species are treated in alphabetical order.

The *erytreae*-group

A difficult group to define, the 10 species included having no single character which will delimit them from other *Trioza* species, and therefore the grouping may be artificial. The description of *erytreae* serves to define the group. The species included are: *erytreae, catlingi, menispermicola, gregoryi, ata, kilimanjarica, tiliacora, carvalhoi, capeneri* and *eafra*.

Known host plant families are Rutaceae, Menispermaceae, Araliaceae and possibly Salicaceae. This is a rather wide range but there may be chemical similarities within these families (Thorne, 1976: 85; Dahlgren, 1977: 260).

Trioza erytreae (Del Guercio)

(Figs 2, 7–9, 34, 35, 40–42, 49, 52, 54, 55, 109–111, 126, 127, 289, 290)

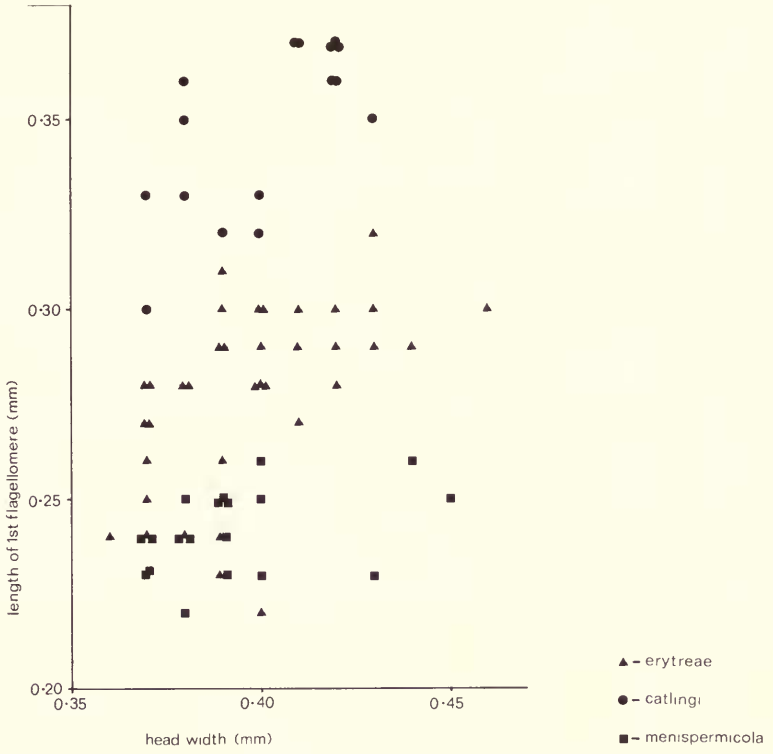
Citrus Psylla (*Trioza*); Lounsbury, 1897: 116.
'Psyllidengalle'; *Citrus aurantium*; Rübsaamen, 1899: 266.
Aleurodes erytreae Del Guercio, 1918: 167. Syntypes, larvae, Ethiopia 'Eritrea' [not traced].
Trioza citri Laing; Waterston, 1922: 49, 55. [Nomen nudum.]
Trioza merwei Pettey, 1923: 30. Syntypes South Africa 'Natal, Durban, on orange and *Toddalia lanceolata*' (SAM; USNM) [not examined]. [Synonymised by Pettey, 1933: 19.]
Spanioza merwei (Pettey); Enderlein, 1926: 400.
Spanioza erythreae (Del Guercio); Boselli, 1930*b*: 228; Pettey, 1933: 19; Harris, 1936: 498.
Citrus Psylla (*Spanioza erytreae*) Del Guercio; Van der Merwe, 1941: 5.
Trioza erytreae (Del Guercio); Capener, 1970: 200.

Only primary taxonomic references are quoted above. Further references on the biology and economic aspects of this species are given in the introduction (p. 4).

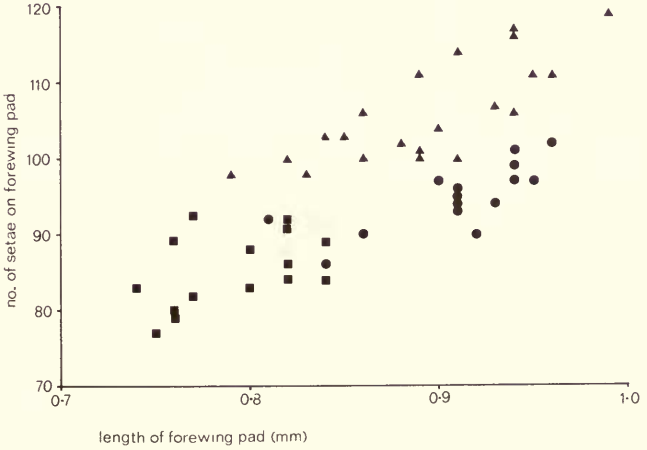
Description. Adult. Integument sparsely covered with short setae. Head, in profile, almost at 90° to longitudinal axis of body, from above almost as wide as mesoscutum; occipital margin rounded; vertex pentagonal with anterior margin deeply incised by median suture, rounded down to frons, lateral ocelli on outer sides of raised tubercles, a shallow concavity present on either side of median suture; median ocellus not visible in dorsal view; frons completely covered by genae in anterior view; genal cones well developed, elongate conical with rounded apices; antennal flagellum 2·08–2·81 times longer than head width, head width to length of 1st flagellum in ♂ 1·26–1·70, in ♀ 1·30–1·82; a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with a long pointed seta and a short truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax strongly arched; pronotum just visible from above, in profile strongly rounded down behind occiput. Mesopraescutum about as wide as long, its anterior margin strongly arcuate in dorsal view, in profile strongly downcurved to pronotum; forewing hyaline, elongate oval and narrowing to a rounded rectangular apex, 2·79–3·09 times longer than wide, radular areas elongate triangular, remainder of membrane devoid of spinules; veins bearing short setae, *R* branch acutangular, *M* branch distal to $Rs-Cu_{1a}$ line, *Cu* stem 2·75–4·20 times longer than Cu_{1b}, m_1 cell value 1·10–1·38, cu_1 cell value 2·56–3·71; forewing 1·59–1·82 times longer than hindwing, costal margin of hindwing with up to two setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-defined meracanthus and without anterior lobe; hind tibia with a moderately developed basal spine, with one outer and three (rarely two) inner apical

spurs. Abdomen with setae on tergites 2 and 3 in ♂, and 3 and 4 in ♀; ♂ proctiger (Fig. 109) with a laterally expanded basal part and a very short and narrow apical part; paramere as in Fig. 110; apical segment of aedeagus simple (Fig. 111); ♀ genital segment (Fig. 127) short, conical, subgenital plate with a ventral bulge, ventral valves of ovipositor weakly serrate apically.

Measurements (19 ♂, 21 ♀). Maximum width of head, ♂ 0·37–0·40, ♀ 0·38–0·46; length of antennal flagellum, ♂ 0·85–1·10, ♀ 0·83–1·10; length of ultimate rostral segment, ♂ 0·09–0·10, ♀ 0·09–0·11; length of forewing, ♂ 2·40–2·96, ♀ 2·61–3·46; length of hind tibia, ♂ 0·50–0·62, ♀ 0·48–0·62.



54



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Figs 54, 55 Scatter diagrams comparing characters of *Trioza erytreae, T. catlingi* and *T. menispermicola*. 54, adults, length of 1st flagellomere against head width. 55, larvae, number of sectasetae on forewing pad against length of forewing pad.

Table 4 Character matrix for the *erytreae*-group. Values and character states edged in heavy lines are diagnostic for each species.

Species	Characters											
	sex	abdominal tergites bearing setae	forewing length / width	Paramere	apex of aedeagus	forewing length / hindwing length	cu_1 cell value	spinules on forewing membrane	head width / length of ultimate rostral segment	head width	head width / length of 1st flagellar segment	density of sectasetae on forewing pad of 5th instar larva	position of anus of 5th instar larva
tiliacora	♂	2–7	2·55–2·67	Fig. 120	Fig. 121	1·68–1·74	2·37–2·69	absent	3·73–4·00	0·40–0·42	1·31–1·40	Fig. 293	Fig. 294
	♀	3–8	2·46–2·61			1·68–1·71	2·51–2·82		3·58–4·00	0·41–0·44	1·32–1·65		
gregoryi	♂	2–3	2·80–2·99	Fig. 114	Fig. 115	1·58–1·77	2·60–3·23	absent	3·45–4·00	0·35–0·38	1·46–1·71	—	—
	♀	3–4	2·72–2·81			1·69–1·75	2·28–3·00		3·25–4·11	0·36–0·39	1·48–1·76		
capeneri	♂	2–3	2·77–3·00			1·46–1·52	1·91–2·40	absent	3·80–4·44	0·38–0·41	1·60–1·86	—	Fig. 297
	♀	3–4	2·84–3·03			1·48–1·58	2·09–2·45		3·91–4·30	0·41–0·43	1·64–1·83		
carvalhoi	♂	2–3	2·74–2·98	Fig. 123	Fig. 124	1·42–1·52	1·60–2·25	absent	3·80–4·55	0·36–0·41	1·44–1·90	Fig. 295	Fig. 296
	♀	3–4	2·69–2·90			1·47–1·54	1·67–2·26		4·00–4·42	0·40–0·43	1·48–1·87		
eafra	♂	2–3	2·69–2·89	Fig. 125		1·38–1·43	1·61–2·45	present	4·00–4·75	0·35–0·40	1·90–2·25	—	—
	♀	3–4	2·60–2·85			1·37–1·56	1·72–2·10		4·22–4·75	0·35–0·42	1·74–2·29		
kilimanjarica	♂	2–3	2·90–3·14	Fig. 118		1·54–1·60	2·12–2·73	absent	5·29–5·43	0·37–0·38	1·61–1·90	—	—
	♀	3–4	2·75–2·92			1·57–1·64	2·19–2·55		5·43–5·71	0·38–0·40	1·60–1·81		
ata	♂	2–3	2·76–3·14	Fig. 116	Fig. 117	1·54–1·68	2·56–3·43	absent	4·60–5·22	0·43–0·49	1·35–1·69	—	—
	♀	3–4	2·96–3·13			1·59–1·65	2·38–3·06		4·60–5·11	0·46–0·50	1·47–1·53		
catlingi	♂	2–3	2·73–3·05	Fig. 112	Fig. 113	1·63–1·71	2·93–4·18	absent	3·73–4·33	0·37–0·41	1·06–1·23	Figs 55, 291	Fig. 292
	♀	3–4	2·62–2·92			1·61–1·80	2·55–3·87		3·82–4·20	0·40–0·43	1·11–1·25		
menispermicola	♂	2–3	2·76–2·93			1·65–1·79	2·85–3·33	absent	3·36–4·30	0·37–0·43	1·54–1·87	Fig. 55	—
	♀	3–4	2·69–2·86			1·64–1·77	2·65–3·83		3·45–4·40	0·38–0·45	1·52–1·80		
erytreae	♂	2–3	2·88–3·09	Fig. 110	Fig. 111	1·59–1·67	2·60–3·71	absent	4·00–4·44	0·37–0·40	1·26–1·70	Figs 55, 289	Fig. 290
	♀	3–4	2·79–3·05			1·62–1·82	2·56–3·67		3·82–4·44	0·38–0·46	1·30–1·82		

Fifth instar larva (Figs 289, 290). Dorsal surface outline oval, about 1·5 times longer than wide. Antenna with 4–5 flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 0·8 mm long, humeral lobe extending forward beyond anterior margin of eye. Caudal plate about 0·65 times as long as wide, anus ventral and distant from posterior margin of abdomen, anus and pore ring as in Fig. 290. Truncate tubular sectasetae forming a dense, entire marginal fringe, postocular seta absent, sectasetae absent from dorsum.

HOST PLANTS. Larvae, which form pit-galls on the lower surfaces of the leaves, and adults have been collected from *Clausena anisata, Fagara capensis, Vepris undulata* and *Citrus* spp.

DISTRIBUTION. Widely distributed in the Afrotropical Region and specimens have been examined from Cameroun, Zaire, Angola, Ethiopia, Ruanda, Uganda, Kenya, Tanzania, Malawi, Zimbabwe, South Africa, São Tomé, St Helena, Réunion and Madagascar.

COMMENTS. *T. erytreae* is the only member of this group known to develop on members of the Rutaceae. Apart from citrus I have collected adults and larvae from *Clausena anisata* in East Africa but Van Der Merwe (1941) records the insect from *Vepris undulata* (as *Toddalia lanceolata*), *Fagara capensis* and *Clausena anisata* (as *C. inaequalis*) in South Africa, stating that the last seemed to be the preferred host. Moran (1968*a*) concludes that *V. undulata* and/or *C. anisata* were probably the indigenous host plants in South Africa.

Members of the *erytreae*-group are morphologically homogeneous and male genitalia characters are not always species diagnostic. These characters can be used to separate *erytreae* from *gregoryi* (Figs 114, 115), *kilimanjarica* (Fig. 118), *carvalhoi* (Figs 122–124) and *eafra* (Fig. 125) but not the rest of the group. *T. tiliacora* is easily separated as it has setae on all abdominal tergites and a relatively broader forewing; *capeneri* has a lower cu_1 cell value and a relatively longer hindwing; in *ata* the clypeus has two pairs of setae and a relatively shorter ultimate rostral segment. It is extremely difficult to separate *catlingi* and *menispermicola* from *erytreae*: in *catlingi* the first flagellomere is longer (head width to length of 1st flagellomere 1·06–1·23) and the marginal sectasetae of the 5th instar larva are less dense (Fig. 54); in *menispermicola* the adults appear identical to *erytreae* but the marginal sectasetae are less dense (Fig. 55). A summary of the characters used to separate members of the *erytreae*-group is given in Table 4.

Trioza catlingi sp. n.

(Figs 54, 55, 112, 113, 291, 292)

Trioza sp.; Catling, 1969*b*: 220; McDaniel & Moran, 1972: 299.

DESCRIPTION. Very similar to *T. erytreae*. First flagellomere longer, head width to length of 1st flagellomere ratio in ♂ 1·06–1·23 and 1·11–1·25 in ♀. Marginal sectasetae of 5th instar larva less dense (Figs 55, 291).

Measurements (10 ♂, 8 ♀). Maximum width of head, ♂ 0·37–0·41, ♀ 0·40–0·43; length of antennal flagellum, ♂ 1·01–1·16, ♀ 1·05–1·22; length of ultimate rostral segment, ♂ 0·09–0·11, ♀ 0·10–0·11; length of forewing, ♂ 2·61–3·12, ♀ 2·74–3·24; length of hind tibia, ♂ 0·58–0·65, ♀ 0·57–0·68.

HOST PLANTS. Larvae, which form pit galls, and adults have been collected from *Stephania abyssinica* and *Cissampelos* sp. (Menispermaceae).

Holotype ♂, **Kenya**: Kakamega For. sta., *c.* 5,000′, 18–19.vii.1974, *Stephania abyssinica (D. Hollis)* (BMNH; dry mounted).

Paratypes. **Kenya**: 10 ♂, 6 ♀, larvae, same data as holotype; 5 ♂, 12 ♀, larvae, S. slope Mt Kenya, Thiba camp, *c.* 6,000′, 9–10.vii.1974, *Cissampelos* sp.; 2 ♂, 2 ♀, Tinderet For., 5 km along Lessos rd, *c.* 8,000′, 20.vii.1974, *Stephania abyssinica*. **Tanzania**: 5 ♂, larvae, Arusha NP, track to Ngurdoto, *c.* 5,000′, 7.vi.1974, *Stephania abyssinica*; 11 ♂, 9 ♀, Ngurdoto Crater rim, *c.* 5,000′, 8.vi.1974; 9 ♂, 12 ♀, larvae, *Stephania abyssinica*; 6 ♂, 1 ♀, Meru FR, track to crater, 6,000–9,000′, 9.vi.1974, *Stephania abyssinica* (*D. Hollis*). **South Africa**: 1 ♀, N. Tvl, Letaba, ix.1966, *Cissampelos torulosa* (*A. P. D. McClean*). (BMNH; NMK; slide and dry mounted and stored in 80% ethanol.)

Trioza menispermicola sp. n.

(Figs 54, 55)

DESCRIPTION. Very similar to *erytreae* and *catlingi*. Differs from *catlingi* in that ratio of head width to length of 1st flagellomere is 1·54–1·87 in ♂ and 1·52–1·80 in ♀. ♀ subgenital plate without ventral bulge. Differs from *erytreae* in the density of marginal sectasetae of the 5th instar larva (Fig. 55).

Measurements (9 ♂, 10 ♀). Maximum width of head, ♂ 0·37–0·43, ♀ 0·38–0·45; length of antennal flagellum, ♂ 0·83–0·89, ♀ 0·84–0·93; length of ultimate rostral segment, ♂ and ♀ 0·10–0·11; length of forewing, ♂ 2·27–2·64, ♀ 2·49–3·08; length of hind tibia, ♂ 0·47–0·53, ♀ 0·49–0·56.

HOST PLANTS. Larvae, which form pit galls, and adults have been collected from *Triclisia macrophylla, T. patens* and *Cissampelos owariensis* (Menispermaceae).

Holotype ♂, **Ghana**: 'Gold Coast; Bunsu, Jan. 1943, *Triclisia macrophylla*' (*H. E. Box*) (BMNH; dry mounted).

Paratypes. **Ghana**: 1 ♂, 5 ♀, larvae, same data as holotype. **Nigeria**: 100 ♂, 100 ♀, larvae, Ibadan, Moor plntn, 7.iv.1956, 'Pseudogalls on creeper' (*R. Donald*); 4 ♂, 2 ♀, larvae, Ilesha, 30.xii.1943, *Cissampelos owariensis* (*H. E. Box*). No locality data: 3 ♂, 2 ♀, larvae, 22.xii.1942, *Triclisia patens* (*H. E. Box*). (BMNH; slide and dry mounted and stored in 80% ethanol.)

Trioza gregoryi sp. n.

(Figs 114, 115)

DESCRIPTION. Adult. Very similar to *erytreae*. Differs in shape of ♂ paramere (Fig. 114) and apical segment of aedeagus (Fig. 115). ♀ subgenital plate smoothly rounded and without ventral bulge.

Measurements (9 ♂, 8 ♀). Maximum width of head, ♂ 0·35–0·38, ♀ 0.36–0·39; length of antennal flagellum, ♂ 0·72–0·86, ♀ 0·75–0·82; length of ultimate rostral segment, ♂ 0·09–0·11, ♀ 0·09–0·12; length of forewing, ♂ 2·30–2·74, ♂ 2·55–2·94; length of hind tibia, ♂ 0·44–0·57, ♀ 0·47–0·56.
Larva and host plant unknown.

Holotype ♂, **Nigeria**: Umuahia, Umudike, 28.viii.1958, yellow tray (*J. L. Gregory*) (BMNH; slide mounted).

Paratypes. **Nigeria**: 6 ♂, 7 ♀, same data as holotype. **Burundi**: 1 ♂, 1 ♀, Gitega, 20.x.1980 (*Pointel*). **Tanzania**: 2 ♂, 1 ♀, E. Usambara mtns, Amani Res. sta., 19–27.vi.1974 (*D. Hollis*). (BMNH; MNHN; slide mounted.)

Trioza ata sp. n.

(Figs 116, 117, 128)

DESCRIPTION. Adult. Very similar to *erytreae* but relatively larger (see measurements below). Clypeus with two pairs of setae; ultimate rostral segment relatively shorter, head width to ultimate rostral segment length ratio 4·6–5·22. ♂ proctiger less expanded laterally, paramere and apical segment of aedeagus as in Figs 116, 117. Ventral valves of ovipositor with more serrations along apical part (Fig. 128).

Measurements (13 ♂, 6 ♀). Maximum width of head, ♂ 0·43–0·49, ♀ 0·46–0·50; length of antennal flagellum, ♂ 1·04–1·20, ♀ 1·13; length of ultimate rostral segment, ♂ and ♀ 0·09–0·10; length of forewing, ♂ 3·11–3·51, ♀ 3·41–3·61; length of hind tibia, ♂ 0·53–0·60, ♀ 0·55–0·57.

Larva unknown.

HOST PLANT. Adults collected from *Salix safsaf* (Salicaceae).

Holotype ♂, **Angola**: 12 mls SW. Luimbale, *c*. 5,500′, 20–21.iii.1972, *Salix safsaf* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Angola**: 19 ♂, 9 ♀, same data as holotype; 7 ♂, 3 ♀, Tundavala, 8–10 mls NW. Sa da Bandeira, 27–29.iii.1972, *Salix safsaf* (*D. Hollis*). **Tanzania**: 2 ♂, Kilimanjaro, Bismark Hut, 2,500–3,000 m, S. Mawenzi, at foot of high pasture, ii.1912 (*Chr. Schröder*). (BMNH; MNHU; slide and dry mounted.)

Trioza kilimanjarica sp. n.

(Fig. 118)

DESCRIPTION. Adult. Similar to *ata*. Distinguished by its smaller size (see measurements below); head width

to ultimate rostral segment length ratio 5·29–5·71. ♂ paramere as in Fig. 118. ♀ subgenital plate without ventral bulge, ventral valves of ovipositor serrate only at extreme apex.

Measurements (7 ♂, 4 ♀). Maximum width of head, ♂ 0·37–0·38, ♀ 0·38–0·40; length of antennal flagellum, ♂ 0·73–0·80, ♀ 0·82; length of ultimate rostral segment, ♂ and ♀, 0·07; length of forewing, ♂ 2·37–2·52, ♀ 2·64–2·87; length of hind tibia, ♂ 0·40–0·45, ♀ 0·42–0·45.

Larva and host plant unknown.

Holotype ♂, **Tanzania**: Kilimanjaro, Bismark Hut, 2,500–3,000 m, S. Mawenzi, at foot of high pasture, ii.1912 (*Chr. Schröder*) (MNHU; slide mounted).

Paratypes. 6 ♂, 4 ♀, same data as holotype (MNHU; BMNH; slide mounted).

Trioza tiliacora sp. n.

(Figs 119–121, 129, 293, 294)

Description. Adult. Of similar general appearance to *erytreae* and *catlingi*. Integument slightly more densely haired. Genal cones less elongate; antennal flagellum 2·05–2·41 times longer than head width. Forewing with an even yellowish infuscation in mature specimens, 2·46–2·61 times longer than wide; veins with slightly longer setae; *Cu* stem 2·35–3·10 times longer than Cu_{1b}; m_1 cell value 1·08–1·26, cu_1 cell value 2·37–2·82. Abdomen with setae present on all visible tergites; ♂ genitalia as in Figs 119–121; ♀ proctiger slightly less elongate apically than in *erytreae* and subgenital plate with less pronounced ventral bulge.

Measurements (4 ♂, 7 ♀). Maximum width of head, ♂ 0·40–0·42, ♀ 0·41–0·44; length of antennal flagellum, ♂ 0·92–1·0, ♀ 0·88–1·01; length of ultimate rostral segment, ♂ 0·10–0·11, ♀ 0·11–0·12; length of forewing, ♂ 2·46–2·81, ♀ 2·61–3·09; length of hind tibia, ♂ 0·56–0·62, ♀ 0·54–0·62.

Fifth instar larva (Figs 293, 294). Dorsal surface outline broadly oval, slightly emarginate posteriorly, about 1·4 times longer than wide. Antenna with 5–6 flagellomeres. Cephaloprothorax separated from rest of thorax which is entire. Forewing pad about 0·8 mm long, extending forward anterior to anterior margin of eye. Caudal plate about 0·56 times as long as wide, anus posteroventral (Fig. 294). Truncate tubular sectasetae forming a moderately dense marginal fringe but absent on posteromedial margin, postocular setae absent, sectasetae absent from dorsum.

Host plant. Adults and larvae collected from *Tiliacora* sp. (Menispermaceae) in association with ants of the genus *Technomyrmex*. The larvae were causing severe leaf curl.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., 19–27.vi.1974, *c.* 3,000′, *Tiliacora* sp., in association with *Technomyrmex* sp. (*D. Hollis*) (BMNH; dry mounted).

Paratypes. 5 ♂, 13 ♀, larvae, same data as holotype (BMNH; slide and dry mounted).

Comments. Unlike other species in the *erytreae*-group, *tiliacora* has the chaetotaxy of the abdominal tergites in the primitive condition. Furthermore the anus of the 5th instar larva is in a posteroventral position which is normally regarded as a primitive state. However, in this case I believe it to be secondarily derived and associated with ant-tending.

Trioza carvalhoi sp. n.

(Figs 122–124, 130, 295, 296)

Description. Adult. In general appearance very similar to *erytreae*. Antennal flagellum slightly shorter, 1·95–2·27 times longer than head width. *Cu* stem 2·19–3·06 times longer than Cu_{1b}, cu_1 cell value 1·6–2·26; hindwing relatively longer, ratio of length of forewing to length of hindwing 1·42–1·54. ♂ genitalia as in Figs 122–124; ♀ subgenital plate without ventral bulge.

Measurements (13 ♂, 19 ♀). Maximum width of head, ♂ 0·36–0·41, ♀ 0·40–0·43; length of antennal flagellum, ♂ 0·79–0·86, ♀ 0·81–0·96; length of ultimate rostral segment, ♂ and ♀, 0·09–0·10; length of forewing, ♂ 2·40–2·55, ♀ 2·66–2·92; length of hind tibia, ♂ 0·48–0·52, ♀ 0·48–0·55.

Fifth instar larva (Figs 295, 296). Very similar to *erytreae*. Antenna with 5–6 flagellomeres. Forewing pad about 0·66 mm long, humeral lobe extending forward to anterior margin of eye. Anus and pore ring as in Fig. 296.

Host plants. Adults and larvae collected from *Cussonia spicata, C. angolensis* and *C. paniculata*. The larvae form pit galls on the lower surfaces of the leaves and cause severe leaf distortion.

Holotype ♂, **Kenya**: N. slope Mt Kenya, Naro Moru lodge area, *c.* 6,000′, 11–14.vii.1974, *Cussonia spicata* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Kenya**: 15 ♂, 13 ♀, same data as holotype; 1 ♀, Thomson's Falls, path into gorge, *c.* 7,800′, 15–16.vii.1974; 1 ♀, Marmanet FR, 5–15 km N. Thomson's Falls, *c.* 8,000′, 16.vii.1974. **Angola**: 1 ♂, 12 mls SW. Luimbale, *c.* 5,500′, 20–21.iii.1972; 11 ♂, 23 ♀, larvae, Chianga, 21–24.iii.1972, *Cussonia angolensis* (*D. Hollis*); 7 ♂, 7 ♀, larvae, 29.x.1970, *Cussonia angolensis*; 1 ♂, 4 ♀, i.1971, vagrants (*A. van Harten*); 3 ♂, 5 ♀, 8.i.1973, *Cussonia angolensis* (*L. Amorim*). **South Africa**: 3 ♂, 3 ♀, larvae, N. Tvl, *Cussonia spicata* (*C. Malan*); 2 ♂, 3 ♀, Natal, Cathedral Peak, 18.i.1964, *Cussonia paniculata* (*A. L. Capener*); 1 ♂, 1 ♀, Swaziland, M.R.S., iv.1966, *Cussonia* sp. (*R.C.H. Sweeney*). (BMNH, NCI; NMK; slide and dry mounted, and stored in 80% ethanol.)

Trioza capeneri sp. n.

(Fig. 297)

Description. Adult. Very similar to *erytreae* and *carvalhoi*. Antennal flagellum 1·95–2·28 times longer than head width. *Cu* stem 2·27–3·40 times longer than Cu_{1b}; m_1 cell value 1·26–1·55, cu_1 cell value 1·91–2·45. Forewing 1·46–1·58 times longer than hindwing. ♂ genitalia not distinguishable from *erytreae*.

Measurements (6 ♂, 6 ♀). Maximum width of head, ♂ 0·38–0·41, ♀ 0·41–0·43; length of antennal flagellum, ♂ 0·79–0·91, ♀ 0·84–0·89; length of ultimate rostral segment, ♂ 0·09–0·10, ♀ 0·10–0·11; length of forewing, ♂ 2·54–2·80, ♀ 2·93–3·12; length of hind tibia, ♂ 0·48–0·51, ♀ 0·50–0·53.

Fifth instar larva. Very similar to *carvalhoi*, anal pore area as in Fig. 297.

Host plant. One sample of adults and larvae collected from *Seemannaralia gerrardii* (Araliaceae). The larvae were forming pit galls on the fruit.

Holotype ♂, **South Africa**: Natal, vii.1972, from pit galls on fruits of *Seemannaralia gerrardii* (*A. L. Capener*) (NCI; slide mounted).

Paratypes. 13 ♂, 18 ♀, larvae, same data as holotype (NCI; BMNH; slide mounted and stored in 80% ethanol).

Comments. The male genitalia of this species are very similar to *erytreae* but the cu_1 cell value and relatively longer hindwing are similar to *carvalhoi*. Its host plant is a member of the Araliaceae and I am regarding it as the sister species of *carvalhoi*.

Trioza eafra sp. n.

(Fig. 125)

Description. Adult. Very similar to *carvalhoi*. Differs in having shorter antennae, antennal flagellum 1·62–1·97 times longer than head width. Forewing membrane covered with spinules except for narrow areas bordering wing veins; cu_1 cell value 1·61–2·45; forewing 1·37–1·56 times longer than hindwing. ♂ paramere as in Fig. 125.

Measurements (11 ♂, 10 ♀). Maximum width of head, ♂ 0·35–0·40, ♀ 0·35–0·42; length of antennal flagellum, ♂ 0·59–0·71, ♀ 0·60–0·80; length of ultimate rostral segment, ♂ and ♀, 0·08–0·09; length of forewing, ♂ 1·87–2·41, ♀ 1·99–2·70; length of hind tibia, ♂ 0·36–0·43, ♀ 0·36–0·47.

Larva unknown.

Host plant. Adults collected from *Cussonia spicata* (Araliaceae). The leaves of the host trees were heavily pitted but no larvae were found.

Holotype ♂, **Kenya**: L. Naivasha, W. shore rd, *c.* 6,200′, 21–22.vi.1974, *Cussonia spicata* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Kenya**: 9 ♂, 16 ♀, same data as holotype; 5 ♂, 8 ♀, Thomson's Falls, path into gorge, *c.* 7,800′, 15–16.vii.1974, *Cussonia* sp.; 1 ♀, Mt Londiani For., 57 km W. Nakaru, *c.* 8,500′, 20.vii.1974 (*D. Hollis*); 2 ♂, 2 ♀, Muguga, vi.1953, trapped. **Tanzania**: 5 ♂, 6 ♀, Nachingwea, xi.1953–iii.1954, trapped (*V. F. Eastop*); 3 ♂, 6 ♀, E. Usambara Mtns, Amani-Muheza rd, below Kiswani, *c.* 2,000′, 21–24.vi.1974, *Cussonia* sp. (*D. Hollis*). (BMNH; NMK; slide and dry mounted.)

Comments. This species is the only member of the *erytreae*-group to have retained (or reverted to) the primitive condition of having spinules on the forewing membrane. It has the relatively longer hindwing and low cu_1 cell value of *carvalhoi* and *capeneri* and I regard it as the sister-species of this pair.

The *litseae*-group

Very similar to the *erytreae*-group but body form and forewings narrower, the hind tibia has two inner apical spurs and the female anal pore has a single ring of wax-producing cells. Two very closely related species are included: *litseae* and *xylopia*. Host plants of both are in the Annonales.

Trioza xylopia sp. n.

(Figs 131–134, 298, 299)

Description. Adult. Integument sparsely covered with very short setae. Head, in profile, almost at 90° to longitudinal axis of body, in dorsal view about as wide as mesoscutum; occipital margin rounded; vertex rounded pentagonal, strongly rounded downwards, with a deep median suture on either side of which is an irregular concavity, lateral ocelli on outer sides of raised humps; median ocellus not visible from above, in anterior view frons completely covered by genae; genal cones well developed, downward pointing, conical with rounded apices; antennal flagellum 1·97–2·53 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6, and 7, apical flagellomere bearing one long pointed and one short truncate seta terminally; clypeus with a pair of short setae, ultimate rostral segment with a pair of setae. Thorax strongly arched; pronotum visible from above, strongly rounded down behind occiput; mesopraescutum, in profile, angled down to pronotum, in dorsal view anterior margin strongly arcuate; forewing elongate oval, narrowing to a subacutangular apex, 2·94–3·43 times longer than wide, membrane with spinules in all cells apart from *c+sc* and r_1, radular areas narrow, veins bearing very short setae, *R* branch acutangular, *M* branching distal to $Rs-Cu_{1a}$ line, *Cu* stem 1·78–2·17 times longer than Cu_{1b}, m_1 cell value 1·09–1·38, cu_1 cell value 1·73–2·19; forewing 1·54 times longer than hindwing, costal margin of hindwing without setae proximal to costal break, setae distal to costal break clearly divided into two groups. Hind coxa with a well-developed meracanthus, without anterior lobe; hind tibia with 1–2 small basal spines and one outer and two inner apical spurs. Abdomen with setae on tergites 2–3 in ♂ and 3–4 in ♀; ♂ proctiger (Fig. 132) roundly expanded laterally, paramere and apical segment of aedeagus as in Figs 133, 134; ♀ genital segment short, conical, ventral surface of ventral valve of ovipositor smooth.

Measurements (7 ♂, 6 ♀). Maximum width of head, ♂ 0·34–0·38, ♀ 0·36–0·41; length of antennal flagellum, ♂ 0·76–0·86, ♀ 0·75–0·84; length of ultimate rostral segment, ♂ 0·06–0·07, ♀ 0·07; length of forewing, ♂ 1·94–2·22, ♀ 2·34–2·59; length of hind tibia, ♂ 0·34–0·43, ♀ 0·41–0·44.

Fifth instar larva (Figs 298, 299). Dorsal surface outline oval but with clear indentations at posterior margin of eye and at base of abdomen, about 1·75 times longer than wide. Antenna with four flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 0·6 mm long, humeral lobe weakly extended forward to just beyond posterior margin of eye. Caudal plate about 0·7 times as long as wide; anus ventral, a short distance from posterior margin of caudal plate, anal pore area as in Fig. 299. Narrow tubular sectasetae forming an even and moderately dense marginal fringe, postocular tubular sectaseta present, sectasetae absent from dorsum.

Host plant. Larvae and adults swept from *Xylopia* sp. (Annonaceae); the larvae are apparently free-living as no evidence of galls was observed.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., *c.* 3,000′, 19–27.vi.1974, *Xylopia* sp. (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Tanzania**: 14 ♂, 17 ♀, same data as holotype. **Kenya**: 1 ♂, W. slope Mt Kenya, Naro Moru lodge area, *c.* 6,500′, 11–14.vii.1974, *Cussonia spicata* (*D. Hollis*). (BMNH; slide and dry mounted.)

Comments. *T. xylopia* is very closely related to *litseae* and the two species can be separated only by the form of the 5th instar larvae (Figs 298–301). Both are similar to *eafra* (p. 42), in the *erytreae*-group, but have only two inner apical spurs on the hind tibia.

Trioza litseae Bordage

(Figs 300, 301)

Trioza litseae Bordage, 1898: 524; 1914: 409. Syntype[s] [? sex], Réunion: *Litsea (Tetranthera) laurifolia* [not traced].

Trioza eastopi Orian, 1972: 4. Holotype ♂, Mauritius: *Litsea glutinosa* (BMNH) [examined]. **Syn. n.**

Description. Adult. Very similar to *xylopia* and, apart from its smaller size, not morphologically distinct from that species.

Measurements (5 ♂, 8 ♀). Maximum width of head, ♂ 0·28–0·32, ♀ 0·30–0·34; length of antennal flagellum, ♂ 0·66–0·73, ♀ 0·61–0·70; length of ultimate rostral segment, ♂ 0·06–0·07, ♀ 0·07–0·08; length of forewing, ♂ 1·39–1·79, ♀ 1·78–2·06; length of hind tibia, ♂ 0·29–0·35, ♀ 0·31–0·36.

Fifth instar larva (Figs 300, 301). Similar to *xylopia* but broader, about 1·5 times longer than wide in dorsal view. Forewing pad about 0·5 mm long. Anus ventral and distant from posterior margin of caudal plate, anal pore area as in Fig. 301. Marginal setae consisting of a moderately dense fringe of broad tubular sectasetae of varying lengths; postocular tubular sectaseta present; dorsum with a sparse covering of sectasetae.

Host plant. Larvae and adults collected from *Litsea glutinosa* [= *L. laurifolia*]; the larvae damage the flower buds and flowers of the host; adults are also known to damage *Vanilla*.

Material examined. Réunion (*Litsea glutinosa*); Mauritius (*L. glutinosa* and 'citrus'). Bordage's type-series was not traced and may have never been preserved. Orian's holotype and some of the paratypes, which are slide-mounted, are damaged in that the gum mountant has become opaque.

Comments (see also p. 43). Orian (1972) regarded *Trioza litseae* Gd as a nomen dubium and I have not been able to trace this description. However, Bordage (1898) described the work of this insect so the name *Trioza litseae* Bordage, 1898, becomes available under Article 16 (a)(viii) of the *Code*.

The *anomalicornis*-group

Defined by the form of the ovipositor (Fig. 138), otherwise the five included species, *anomalicornis, kakamegae, thibae, tavandula* and *luvandata*, are similar to those of the *erytreae*-group. Two species are known to develop on *Apodytes dimidiata* (Icacinaceae).

Trioza anomalicornis sp. n.

(Figs 17, 135–138)

Description. Adult. Integument sparsely covered with long setae. In profile, head moderately depressed from longitudinal axis of body, in dorsal view almost as wide as mesoscutum; occipital margins rounded; vertex pentagonal, gently rounded downwards, median suture clearly defined, lateral concavities weak, lateral ocelli on outer sides of strongly raised humps, frontal lobes absent; median ocellus visible from above, frons completely covered by genae in anterior view; genal cones elongate conical, slender, with narrowly rounded apices; antennal flagellum 1·84–2·0 times longer than head width, each flagellomere with a pair of long setae apically, apart from apical flagellomere which bears one long pointed seta and one large campaniform sensillum apically (Fig. 17), a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7; clypeus with one pair of setae, ultimate rostral segment densely setose. Thorax strongly arched; pronotum just visible from above, in profile strongly downcurved behind occiput and well below plane of vertex and mesopraescutum; mesopraescutum, in profile, strongly rounded down to pronotum, in dorsal view its anterior margin narrowly arcuate; forewing elongate oval and narrowing to rounded acutangular apex, 2·88–3·12 times longer than wide, radular areas narrow elongate, remainder of membrane devoid of spinules; veins bearing very short setae, *R* branch acutangular; *M* branching distal to $Rs-Cu_{1a}$ line, *Cu* stem 2·81–3·94 times longer than Cu_{1b}, m_1 cell value 1·08–1·17, cu_1 cell value 2·14–3·00; forewing 1·88–1·98 times longer than hindwing, costal margin of hindwing with 1–2 setae proximal to costal break, setae distal to costal break clearly divided into two groups. Hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia relatively long, 1·49–1·69 times longer than head width, with a pair of small spines basally and one outer and three inner apical spurs, the middle spur of the inner trio being less developed than the remaining two. Abdomen with setae on tergite 3 in ♂, and 4 in ♀; ♂ proctiger with a greatly expanded basal part (Fig. 135), paramere and apical segment of aedeagus as in Figs 136, 137; ♀ genital segment (Fig. 138) short, truncate, ventral valve of ovipositor with saw-like teeth on ventral and lateral surfaces, posterior margin of subgenital plate deeply incised ventrally.

Measurements (1 ♂, 3 ♀). Maximum width of head, ♂ 0·38, ♀ 0·35–0·40; length of antennal flagellum, ♂ 0·70, ♀ 0·70–0·76; length of ultimate rostral segment, ♂ and ♀ 0·09; length of forewing, ♂ 2·72, ♀ 2·94–3·05; length of hind tibia, ♂ 0·59, ♀ 0·59–0·60.

Larva and host plant unknown.

Holotype ♂, **Nigeria**: Ibadan, Moor plntn, 25–26.xi.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Nigeria**: 1 ♀, vi.1956 (*V. F. Eastop*); 1 ♀, v.1959; 1 ♀, 2.vi.1961 (*F. A. Squire*). **Cameroun**: 1 ♀, Bamenda, 1.ii.1957, yellow tray (*V. F. Eastop*). (*BMNH*; slide and dry mounted.)

Comment. *T. anomalicornis* and the following four species described below seem to form a natural group, having a similarly derived ovipositor and a slightly thickened antennal flagellum. In other respects they resemble the *erytreae*-group. *T. anomalicornis* is easily distinguished by its antennal structure, the relatively short hindwing, the elongate hind tibia, the form of the ♂ proctiger, paramere and apical aedeagal segment, and the deeply emarginate ♀ subgenital plate. The remaining four species in the group can only be separated from one another on ♂ genital characters.

Trioza kakamegae sp. n.

(Figs 139–141, 302, 303)

Description. Adult. Integument sparsely covered with moderately long setae. In profile, head depressed from longitudinal axis of body, in dorsal view as wide as mesoscutum; occipital margins rounded; vertex pentagonal, rounded downwards, without frontal lobes, median suture clearly defined, lateral ocelli on outer sides of raised humps; median ocellus visible from above, frons completely covered by genae in anterior view; genal cones elongate conical, broad, with broadly rounded apices; antennal flagellum 2·05–2·47 times longer than head width, each flagellomere with a pair of short setae apically apart from apical flagellomere which bears a long pointed seta and a short truncate seta, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7; clypeus with a pair of setae, ultimate rostral segment with a pair of setae. Thorax strongly arched; pronotum just visible from above, in profile strongly rounded down behind occiput and well below plane of vertex and mesopraescutum; mesopraescutum with anterior margin narrowly arcuate in dorsal view and strongly rounded down to pronotum in lateral view; forewing elongate oval, narrowing to rounded acutangular apex, 2·69–2·86 times longer than wide; *Cu* stem 2·89–3·51 times longer than Cu_{1b}, m_1 cell value 1·18–1·29, cu_1 cell value 1·74–2·48; forewing 1·55–1·65 times longer than hindwing, costal margin of hindwing with 0–1 seta proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia 1·16–1·36 times longer than head width, with a pair of small basal spines, with one outer and three inner apical spurs, latter of equal development. Abdomen with setae on tergite 3 in ♂ and 4 in ♀; basal part of ♂ proctiger (Fig. 139) weakly expanded, apical segment of aedeagus and paramere as in Figs 140, 141; ♀ genital segment short, truncate, posterior margin of subgenital plate truncate.

Measurements (6 ♂, 5 ♀). Maximum width of head, ♂ 0·34–0·42, ♀ 0·37–0·41; length of antennal flagellum, ♂ 0·83–0·99, ♀ 0·82–0·96; length of ultimate rostral segment, ♂ 0·09–0·10, ♀ 0·09–0·11; length of forewing, ♂ 2·46–2·95, ♀ 2·78–3·18; length of hind tibia, ♂ 0·46–0·53, ♀ 0·45–0·51.

Fifth instar larva (Figs 302, 303). Dorsal surface outline broadly oval, about 1·4 times longer than wide. Antenna with four flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 0·75 mm long; humeral lobe extending forward in front of anterior margin of eye. Caudal plate about 0·65 times as long as wide; anus ventral and distant from posterior margin of abdomen, anus and pore ring as in Fig. 303. Truncate tubular sectasetae forming an even dense marginal fringe; postocular seta absent; sectasetae absent from dorsum.

Host plant. Larvae and adults swept from *Apodytes dimidiata* (Icacinaceae).

Holotype ♂, **Kenya**: Kakamega For. sta., *c.* 5,000′, 18–19.vii.1974, *Apodytes dimidiata* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Kenya**: 6 ♂, 5 ♀, larvae, same data as holotype; 1 ♀, 4.viii.1980 (*Min. of Ag.*); 3 ♂, 6 ♀, Muguga, vi.1953; 1 ♂, 1 ♀, vii.1954 (*V. F. Eastop*) (BMNH; slide and dry mounted.)

Trioza thibae sp. n.

(Figs 142–144)

Description. Adult. Very similar to *kakamegae*. Differs in the shape of the ♂ proctiger, paramere and aedeagus (Figs 142–144).

Measurements (3 ♂, 3 ♀). Maximum width of head, ♂ 0·40–0·44, ♀ 0·41–0·44; length of antennal

flagellum, ♂ 0·94–1·05, ♀ 0·93–0·98; length of ultimate rostral segment, ♂ and ♀ 0·10; length of forewing, ♂ 2·89–2·99, ♀ 3·11–3·28; length of hind tibia, ♂ 0·49–0·53, ♀ 0·50–0·52.

Fifth instar larva. Very similar to *kakamegae*. Dorsal outline about 1·3 times longer than wide, forewing pad about 0·8 mm long, caudal plate about 0·6 times as long as wide.

HOST PLANT. Larvae and adults swept from *Apodytes dimidiata* (Icacinaceae).

Holotype ♂, **Kenya**, S. slope of Mt Kenya, Thiba camp, *c.* 6,000′, 9–10.vii.1974, *Apodytes dimidiata* (*D. Hollis*) (BMNH; slide mounted).

Paratypes. 2 ♂, 4 ♀, larvae, same data as holotype (BMNH; slide and dry mounted).

Trioza tavandula sp. n.

(Figs 145–147)

DESCRIPTION. Adult. Very similar to *kakamegae* and *thibae*. Integument bearing much shorter hairs. Antennal flagellum 1·90–2·32 times longer than head width. Thorax less strongly arched, pronotum more clearly visible from above, anterior margin of mesopraescutum less narrowly arcuate. Forewing 2·83–3·16 times longer than wide; hind tibia 1·07–1·16 times longer than head width. ♂ proctiger, paramere and aedeagus as in Figs 145–147; ♀ subgenital plate with obtusangular posterior margin.

Measurements (6 ♂, 3 ♀). Maximum width of head, ♂ 0·38–0·40, ♀ 0·40–0·42; length of antennal flagellum, ♂ 0·76–0·88, ♀ 0·83–0·92; length of ultimate rostral segment, ♂ and ♀ 0·09–0·10; length of forewing, ♂ 2·53–2·59, ♀ 2·77–3·03; length of hind tibia, ♂ 0·43–0·44, ♀ 0·44–0·48.

Larva and host plant unknown.

Holotype ♂, **Angola**: Tundavala, 8–10 mls NW. Sa da Bandeira, 27–29.iii.1972, general sweeping (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Angola**: 4 ♂, same data as holotype; 7 ♂, 6 ♀, 5.iii.1972 (BMNH; slide and dry mounted).

Trioza luvandata sp. n.

(Figs 148–150)

DESCRIPTION. Adult. Very similar to *kakamegae* and *thibae*. Differs in shape of ♂ paramere and aedeagus (Figs 148–150).

Measurements (3 ♂, 1 ♀). Maximum width of head, ♂ 0·40–0·41, ♀ 0·40; length of antennal flagellum, ♂ (incomplete), ♀ 0·85; length of ultimate rostral segment, ♂ 0·08–0·10, ♀ 0·09; length of forewing, ♂ 2·83–2·86, ♀ 2·75; length of hind tibia, ♂ 0·44–0·48, ♀ 0·44.

Larva and host plant unknown.

Holotype ♂, **Angola**: Tundavala, 9 mls NW. Sa da Bandeira, 5.iii.1972, swept (*D. Hollis*) (BMNH; slide mounted).

Paratypes. 2 ♂, 1 ♀, same data as holotype (BMNH; slide mounted).

The *neoboutonia*-group

Defined by the relatively short 3rd flagellomere and the presence of only two inner apical spurs on the hind tibia. Females of this group show a tendency towards a reduction of the outer ring of wax-producing cells around the anal pore. Six species are included: *neoboutonia, harteni, chiangae, bamendae, dinaba* and *nachingweae*. Known host plants are in the Euphorbiaceae and Uapacaceae.

Trioza neoboutonia sp. n.

(Figs 14, 151–155, 304, 305)

DESCRIPTION. Adult. Integument sparsely covered with short setae. Head, in profile, moderately depressed from longitudinal axis of body, in dorsal view narrower than mesoscutum; occipital margin subangular dorsomedially, rounded dorsolaterally and laterally; vertex pentangular, with an irregular concavity on either side of median sutùre, latter more strongly developed anteriorly, frontal lobes weakly developed; median ocellus just visible from above; frons completely covered by genae in anterior view; genal cones short, conical, in lateral view their longitudinal axis slightly depressed from plane of vertex; clypeus with

one pair of setae, ultimate rostral segment with two pairs of setae; antennal flagellum 1·95–2·12 times longer than head width, 3rd flagellomere very short, ratio of length of 2nd flagellomere to 3rd 1·76–2·35, a single rhinarium is present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere bearing one long pointed seta and one short truncate seta apically. Thorax moderately arched; pronotum clearly visible from above, its anterior margin strongly rounded down behind occiput; mesopraescutum about as long as wide, its anterior margin rounded; forewing elongate oval, narrowing to a rounded obtusangular apex, 2·7–2·91 times longer than wide; radular areas narrow elongate triangular, remainder of membrane devoid of spinules apart from a short narrow band at base of claval suture; veins bearing short setae, *R* branch acutangular, *M* branching distal to $Rs-Cu_{1a}$ line, *Cu* stem 1·63–1·84 times longer than Cu_{1b}, m_1 cell value 1·13–1·23, cu_1 cell value 1·61–1·91; forewing 1·5–1·62 times longer than hindwing, costal margin of hindwing with 2–4 straight setae proximal to costal break, setae immediately distal to costal break absent, 2–3 curved setae present immediately proximal to retinaculum; hind coxa with a well-developed meracanthus, without anterior lobe; hind tibia relatively long, 1·37–1·48 times longer than head width, with a well-developed basal spine, with one outer and two inner spurs apically. Abdomen with setae on tergite 3 in ♂ and tergite 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 152–154; ♀ genital segment (Fig. 155) short, triangular in profile, ovipositor valves smooth, apex of proctiger upcurved, subgenital plate weakly serrate apicoventrally, anus with a single ring of wax-producing cells.

Measurements (5 ♂, 7 ♀). Maximum width of head, ♂ 0·40–0·42, ♀ 0·42–0·44; length of antennal flagellum, ♂ 0·83–0·87, ♀ 0·82–0·88; length of ultimate rostral segment, ♂ and ♀ 0·09–0·10; length of forewing, ♂ 2·53–2·75, ♀ 2·75–2·96; length of hind tibia, ♂ 0·56–0·62, ♀ 0·59–0·63.

Fifth instar larva (Figs 304, 305). Dorsal surface outline oval, about 1·5 times longer than wide. Antenna with 5–6 flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 0·65 mm long, humeral lobe extending forward to just behind anterior margin of eye. Caudal plate about 0·65 times as long as wide, anus ventral and distant from posterior margin of abdomen, anal pore area as in Fig. 305. Short, truncate, tubular sectasetae forming an even, dense marginal fringe; postocular seta absent; sectasetae absent from dorsum.

HOST PLANT. Larvae, which form pit galls on the lower surfaces of the leaves, and adults swept from *Neoboutonia* sp. (Euphorbiaceae).

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., *c.* 3,000′, 19–27.vi.1974, *Neoboutonia* sp. (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Tanzania**: 10 ♂, 8 ♀, larvae, same data as holotype; 1 ♀, yellow tray (BMNH; slide and dry mounted).

COMMENTS. Within this species-group *neoboutonia* displays the most derived condition of head and thorax structure, wing venation and abdominal chaetotaxy. Of the three known larvae in the group, that of *neoboutonia* is the most highly evolved and adapted to living in a pit gall.

Trioza harteni sp. n.

(Figs 156–158, 306, 307)

DESCRIPTION (only slide-mounted material available for study). Adult. Integument sparsely covered with short setae. Head, from above, narrower than mesoscutum; frons not visible in anterior view; genae short, broadly rounded; antennal flagellum 2·07–2·72 times longer than head width, 3rd flagellomere short, ratio of length of 2nd flagellomere to 3rd 1·45–1·97, a single rhinarium present subapically on flagellomeres 2, 4, 6, and 7, apical flagellomere bearing one long pointed seta and one short truncate seta apically; clypeus with one pair of setae, ultimate rostral segment with one pair of setae. Pronotum strongly rounded down behind occiput; mesopraescutum, from above, wider than long, its anterior margin broadly arcuate; forewing elongate oval, strongly narrowing to subangular apex, 2·62–2·84 times longer than wide, radular areas narrow elongate, remainder of membrane devoid of spinules; veins bearing short setae, *R* branch acutangular, *M* branching distal to $Rs-Cu_{1a}$ line, *Cu* stem 1·13–1·48 times longer than Cu_{1b}, m_1 cell value 1·37–1·46, cu_1 cell value 1·48–1·91; forewing 1·75–1·86 times longer than hindwing, costal margin of hindwing with up to four straight setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia relatively short, 1·19–1·25 times longer than head width, with a group of small spines basally, with 0–1 outer and 1–2 (rarely 3) inner spurs apically. Abdomen with setae on tergites 3–8 in ♂ and 4–8 in ♀; ♂ proctiger with a moderately swollen basal part and a very short and narrow apical part, paramere as in Fig.

157, apical part of aedeagus simple; ♀ genital segment as in Fig. 158, ventral surface of ventral valve of ovipositor weakly serrate, outer ring of wax-producing cells around anus incomplete.

Measurements (2 ♂, 3 ♀). Maximum width of head, ♂ 0·57–0·59, ♀ 0·59–0·62; length of antennal flagellum, ♂ 1·48–1·55, ♀ 1·22–1·40; length of ultimate rostral segment, ♂ 0·10, ♀ 0·10–0·11; length of forewing, ♂ 3·99–4·07; ♀ 4·63–4·73; length of hind tibia, ♂ 0·71–0·72, ♀ 0·70–0·75.

Fifth instar larva (Figs 306, 307). Dorsal surface outline showing head, thorax and abdomen clearly defined, about 1·6 times longer than wide. Antenna with seven flagellomeres. Cephaloprothorax, mesothorax and metathorax clearly defined. Forewing pad about 1·3 mm long, humeral lobe very weakly developed and anterior margin of forewing pad reaching barely anterior to posterior margin of cephaloprothorax. Basal two-thirds of abdomen not sclerotised, caudal plate about half as long as wide. Anus ventral but close to posterior margin of abdomen, anal pore area as in Fig. 307. Marginal setae simple with sparsely scattered pointed sectasetae, anterior margin of cephaloprothorax between eyes without sectasetae but with scattered lanceolate setae, four postocular pointed sectasetae present, sectasetae absent from dorsum.

Host plant. Larvae taken from large, enclosed galls on *Uapaca nitida* (Uapacaceae); adults reared from these larvae (van Harten, pers. comm.).

Holotype ♂, **Angola**: Chinaga, 19.x.1970, galls of *Uapaca nitida* (*A. van Harten*) (BMNH; slide mounted).
Paratypes. 1 ♂, 3 ♀, larvae, same data as holotype (BMNH; slide mounted).

Comment. *T. harteni* displays primitive character states for the *Cu* stem and, therefore, a low cu_1 cell value, and abdominal chaetotaxy. The larva is very non-triozid in general appearance but this is almost certainly due to the fact that it develops in an enclosed gall.

Trioza chiangae sp. n.

(Figs 159–161, 308)

Description (only slide-mounted material available for study). Adult. Very similar to *harteni* but smaller. Clypeus with a pair of short setae, ultimate rostral segment without setae. Forewing more elongate, 2·87–3·18 times longer than wide, *Cu* stem 2·11–2·52 times longer than Cu_{1b}, m_1 cell value 1·41–1·65, cu_1 cell value 2·0–2·82; hind tibia relatively short, 1·07–1·21 times longer than head width. Abdomen with setae on tergites 3–5 in ♂ and ♀; ♂ paramere as in Fig. 160; ♀ genital segment (Fig. 161) with ovipositor valves smooth apically, anal pore with a double ring of wax-producing cells.

Measurements (6 ♂, 6 ♀). Maximum width of head, ♂ 0·37–0·39, ♀ 0·40–0·44; length of antennal flagellum, ♂ 0·86–0·93, ♀ 0·85–0·92; length of ultimate rostral segment, ♂ and ♀ 0·06–0·07; length of forewing, ♂ 2·41–2·56, ♀ 2·93–3·08; length of hind tibia, ♂ 0·41–0·46, ♀ 0·45–0·48.

Fifth instar larva (Fig. 308). Very similar to *harteni*. About 1·8 times longer than wide; forewing pad about 0·7 mm long; caudal plate not at all developed; anal pore area damaged in specimens available but similar in shape and structure to *harteni*. Long and short, narrow conical sectasetae with truncate apices forming a sparse marginal fringe, including anterior margin of cephaloprothorax; five postocular sectasetae present; sectasetae absent from dorsum.

Host plant. Larvae and adults collected from *Uapaca nitida* (Uapacaceae); the larvae are free-living among unfolded leaves on the growing points (A. van Harten, pers. comm.).

Holotype ♂, **Angola**: Chianga, 12.ix.1973, *Uapaca nitida* (*A. van Harten*) (BMNH; slide mounted).
Paratypes. 5 ♂, 6 ♀, larvae, same data as holotype (BMNH; slide mounted).

Comment. *T. chiangae* has a relatively long *Cu* stem and, therefore, a relatively higher cu_1 cell value than *harteni*, but the chaetotaxy of the abdominal tergites is intermediate between *harteni* and *neoboutonia*. The free-living larva is relatively unmodified for a triozid.

Trioza bamendae sp. n.

(Figs 162–164)

Description. Adult. Integument very sparsely covered with short setae. Head, in profile, very slightly depressed from longitudinal axis of body, from above at least as wide as mesoscutum; occipital margin deeply notched medially; vertex in same plane as thorax, median suture shallow, with a secondary furrow on either side originating from a point just above median ocellus and extending back diagonally to occipital

margin, frontal lobes well developed, their anterior margins arcuate; median ocellus visible from above, frons not visible in anterior view; genal cones well developed, broadly conoid, in profile slightly depressed from plane of vertex; antennal flagellum 1·22–1·40 times longer than head width, ratio of length of 2nd flagellomere to 3rd 2·18–3·39, a double rhinarium present subapically on 2nd flagellomere and a single rhinarium present subapically on flagellomeres 4, 6, and 7, apical flagellomere with one long seta and a very short truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with a pair of setae. Thorax flattened; pronotum mostly flat with only anterior margin sharply downcurved behind occiput; mesopraescutum, from above, longer than wide, with broadly rounded anterior margin; forewing elongate elipsoid, strongly narrowing distally to rounded acutangular apex, 3·12–3·50 times longer than wide, membrane devoid of spinules apart from narrow radular areas; veins almost devoid of setae, *R* branch acutangular, *M* branching distal to $Rs-Cu_{1a}$ line, *Cu* stem 1·42–2·58 times longer than Cu_{1b}, m_1 cell value 1·00–1·27, cu_1 cell value 2·03–3·22; forewing 1·73–1·93 times longer than hindwing, costal margin of hindwing with up to two setae proximal to costal break and with at most one seta distal to costal break; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with 1–2 small conoid spines basally, and one outer and two inner apical spurs. Abdomen with setae on tergite 3 in ♂ and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 162–164; ♀ genital segment short, conoid, anus with a single ring of wax-producing cells, ventral valve of ovipositor with three transverse ridges on ventrolateral surface.

Measurements (6 ♂, 7 ♀). Maximum width of head, ♂ 0·30–0·34, ♀ 0·31–0·34; length of antennal flagellum, ♂ 0·39–0·44, ♀ 0·39–0·46; length of ultimate rostral segment, ♂ 0·05, ♀ 0·05–0·06; length of forewing, ♂ 1·84–2·08, ♀ 2·12–2·35; length of hind tibia, ♂ 0·45–0·50, ♀ 0·43–0·50.

Larva and host plant unknown.

Holotype ♂, **Cameroun**: Bamenda, 20–24.i.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Cameroun**: 3 ♂, 7 ♀, same data as holotype; 2 ♂, 2 ♀, 25–31.i.1957; 1 ♂, 1 ♀, 1.ii.1957; 1 ♀, 6.ii.1957 (BMNH; slide and dry mounted).

COMMENT. *T. bamendae* and the following species are regarded as sister-species as both share the unique character of the double rhinarium on the 2nd flagellomere (Fig. 25).

Trioza dinaba sp. n.

(Figs 16, 25, 165–168)

DESCRIPTION. Adult. Very similar to *bamendae*. Secondary diagonal furrows on vertex much less well defined, frontal lobes broad; antennal flagellum 1·22–1·59 times longer than head width, ratio of length of 2nd flagellomere to 3rd 1·61–3·5, 2nd flagellomere as in Fig. 25. Forewing 2·93–3·38 times longer than wide; *Cu* stem branching from $R+M+Cu$ proximally to branch of *R* stem, 2·81–4·67 times longer than Cu_{1b}, m_1 cell value 1·06–1·29, cu_1 cell value 2·31–4·0. ♂ proctiger, paramere and aedeagus as in Figs 166–168; anus of ♀ with an incomplete double ring of wax-producing cells.

Measurements (10 ♂, 10 ♀). Maximum width of head, ♂ 0·32–0·34, ♀ 0·32–0·36; length of antennal flagellum, ♂ 0·46–0·51, ♀ 0·43–0·50; length of ultimate rostral segment, ♂ and ♀ 0·06–0·07; length of forewing, ♂ 2·08–2·32, ♀ 2·30–2·70; length of hind tibia, ♂ 0·45–0·50, ♀ 0·44–0·51.

Larva and host plant unknown.

Holotype ♂, **Nigeria**: Ibadan, Moor plntn, 11.viii.1956, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Nigeria**: 9 ♂, 11 ♀, same data as holotype; 1 ♂, vi.1956; 1 ♂, Umuahia, Umudike, 28.viii.1958. **Ghana**: 2 ♂, 2 ♀, Tafo, 15.v.1956, yellow tray (*V. F. Eastop*). **Zaire** ['Congo Belge']: 1 ♀, P.N.G., Miss. de Saeger, II/fd/5, 10.ix.1951; 1 ♂ II/fd/17, 9.vii.1952 (*H. de Saeger*). (BMNH; MRAC; slide and dry mounted.)

Non-paratypic material. **Uganda**: 1 ♀, Jinja, xii.1954–ii.1955, U.V. lamp (*P. S. Corbett*) (BMNH); slide mounted. This specimen differs from the type-series in having a triple rhinarium present apically on the 2nd flagellomere.

Trioza nachingweae sp. n.

(Figs 169–172)

DESCRIPTION (only slide-mounted material available for study). Adult. Very similar in general appearance to *fuscivena* (p. 61) but smaller. Antennal flagellum shorter, 1·03–1·40 times longer than head width, ratio

of length of 2nd flagellomere to 3rd 1·82–2·67; ultimate rostral segment relatively longer. Forewing (Fig. 169) 2·74–3·12 times longer than wide, veins sparsely clothed with very short setae, *Cu* stem 1·59–2·65 times longer than Cu_{1b}, m_1 cell value 1·10–1·28, cu_1 cell value 1·59–2·50; forewing 1·54–1·58 times longer than hindwing; hind tibia with one outer and two inner apical spurs, of which the second inner spur is weak and difficult to see. ♂ proctiger narrow, tubular, paramere and aedeagus as in Figs 170, 171; ♀ genital segment (Fig. 172) elongate triangular in profile, anus with a single ring of wax-producing cells, subgenital plate with acutangular posterior margin.

Measurements (6 ♂, 3 ♀). Maximum width of head, ♂ 0·34–0·36, ♀ 0·37–0·40; length of antennal flagellum, ♂ 0·42–0·49, ♀ 0·38; length of ultimate rostral segment, ♂ 0·08–0·09, ♀ 0·09–0·10; length of forewing, ♂ 1·78–1·92, ♀ 2·18–2·30; length of hind tibia, ♂ 0·47–0·50, ♀ 0·51–0·53.

Larva and host plant unknown.

Holotype ♂, **Tanzania**: Nachingwea, xi.1953–iii.1954, trapped (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Tanzania**: 6 ♂, 3 ♀, same data as holotype; 1 ♂, 1 ♀, x.1953–ii.1954. (BMNH; slide mounted.)

COMMENTS. *T. nachingeae* is distinguished from other members of the *neuboutonia*-group by the presence of brown pigmentation along the course of *R* and R_1 and at the bases of *M* and *Cu* on the forewing. This feature has apparently arisen independently in many groups of triozids.

The *hargreavesi*-group

Defined by the extraordinary development of supplementary antennal rhinaria which have associated bulbous or mushroom-shaped sensilla (Figs 22, 23). Two species, *hargreavesi* and *mirificornis*, are included. Larvae and host plants are not known but original collection data suggest that the larvae of both species form pit galls on a forest climbing plant.

Trioza hargreavesi sp. n.

(Figs 22, 173–175)

DESCRIPTION. Adult. Integument densely covered with short setae. Head, in profile, almost at 90° to longitudinal axis of body, in dorsal view slightly narrower than mesoscutum; occipital margin sharp dorsomedially; vertex pentagonal, rounded downwards, with a deep irregular concavity on either side of median suture which is deep and well defined, frontal lobes not developed; median ocellus visible from above, frons just visible between genae in anterior view; genal cones small, rounded; antennal flagellum approximately 1·8 times longer than head width (no complete antennae in type-series), with a single rhinarium subapically on flagellomeres 2, 4, 6 and 7, 1st flagellomere with 30–35 rhinaria along its length (Fig. 22), each bearing a small mushroom-shaped sensillum; clypeus with a pair of setae, ultimate rostral segment with at least four pairs of setae. Thorax, in profile, strongly arched; pronotum, from above, hardly visible, in profile strongly rounded down behind occiput; mesopraescutum, from above, longer than wide, its anterior margin strongly arcuate and, in profile, strongly angled down to pronotum; forewing elongate oval, narrowing to rounded obtusangular apex, 2·36–2·45 times longer than wide, radular areas narrow and elongate, remainder of membrane devoid of spinules; veins bearing short setae, *R* branch acutangular, *M* branching distal to $Rs-Cu_{1a}$ line, *Cu* stem 1·24–1·72 times longer than Cu_{1b}, m_1 cell value 1·32–1·6, cu_1 cell value 1·78–1·98; forewing 1·66–1·77 times longer than hindwing, costal margin of hindwing with 0–2 setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with 2–4 small spines basally and with one outer and two inner apical spurs. Abdomen with setae on tergite 3 or 3 and 4 in ♂, and on 4 or 4 and 5 in ♀; ♂ proctiger with weak lateral expansions, paramere and aedeagus as in Figs 174, 175; ♀ genital segment short, conical, ventral valves of ovipositor regularly saw-toothed on ventral and lateral surfaces in apical half, subgenital plate short and with truncate posterior margin.

Measurements (5 ♂, 5 ♀). Maximum width of head, ♂ 0·65–0·74, ♀ 0·69–0·76; length of antennal flagellum, ♀ 1·25 (approx.); length of ultimate rostral segment, ♂ and ♀ 0·13–0·16; length of forewing, ♂ 4·45–5·02, ♀ 5·02–5·42; length of hind tibia, ♂ 0·72–0·81, ♀ 0·81–0·84.

Larva and host plant unknown. (A label in the original tube containing the type-series from Uganda stated 'nymphs in pits in leaf of forest climber' but no larvae were present.)

Holotype ♂, **Uganda**: F. Kawanda, 14.ii.1940, nymphs in pits in leaf of forest climber (*H. Hargreaves*) (BMNH; slide mounted).

Paratypes. **Uganda**: 8 ♂, 6 ♀, same data as holotype. **Nigeria**: 1 ♀, NE. State, Ngel Nyaki, 31.iii.1970, 5,000′; 1 ♀, K[wara] State, 20 mls W. Lokaja, 21.iii.1970; 1 ♀, SE. State, Obudu CR, 21.iii.1971 (*J. T. Medler*). (BMNH; slide and dry mounted, and stored in 80% ethanol.)

COMMENTS. *T. hargreavesi* and *mirificornis* are grouped together as sister-species because they both share the extraordinary development of multiple supplementary rhinaria on the antennal flagellum. At present I can find no further derived characters relating this group with other species in the genus.

Trioza mirificornis sp. n.

(Figs 23, 176, 177)

DESCRIPTION. Adult. Very similar to *hargreavesi* but smaller. Flagellomeres 1–7 bearing many rhinaria, each rhinarium bearing a bulbous sensillum (Fig. 23), 1st flagellomere with about 60 rhinaria, 2nd with 18–25, 3rd with 7–15, 4th with 5–20, 5th with about 11, 6th with about seven, and 7th with one, apical flagellomere with a long pointed seta and a short truncate seta apically; ultimate rostral segment with a pair of setae. Pronotum more clearly visible from above, anterior margin of mesopraescutum less strongly arcuate and less pushed forward, rounded down to pronotum; forewing narrower, 2·51–2·7 times longer than wide, *Cu* stem 1·70–2·32 times longer than Cu_{1b}, m_1 cell value 1·13–1·29, cu_1 cell value 1·75–2·36; forewing 1·56–1·64 times longer than hindwing. ♂ paramere and aedeagus as in Figs 176, 177; ♀ subgenital plate with acutangular posterior margin, ventral valves of ovipositor smooth.

Measurements (7 ♂, 4 ♀). Maximum width of head, ♂ 0·47–0·55, ♀ 0·51–0·60; length of antennal flagellum, ♂ 0·84 (only one complete specimen); length of ultimate rostral segment, ♂ and ♀ 0·08–0·10; length of forewing, ♂ 3·21–3·83, ♀ 4·17–4·53; length of hind tibia, ♂ 0·54–0·65, ♀ 0·66–0·67.

Larva and host plant unknown. (The Uganda type-material of this species was found in the BMNH bearing similar data relating to larvae as the previous species.)

Holotype ♂, **Uganda**: F. Kawanda, 24.x.1939, nymphs in pits in leaf of forest climber (*H. Hargreaves*) (BMNH; slide mounted).

Paratypes. **Uganda**: 16 ♂, 25 ♀, same data as holotype. **Cameroun**: 1 ♀, Bamenda, 6.ii.1957, yellow tray (*V. F. Eastop*). (BMNH; slide mounted and stored in 80% ethanol.)

The *obsoleta*-group

A poorly defined group in which the species usually have greatly reduced hindwings, well-developed anterior lobes on the hind coxae and two inner apical spurs on the hind tibia. Five Afrotropical species are included: *afrobsoleta, gonjae, boxi, afrosersalisia* and *mimusops*, the latter two only tentatively. All five species have host plants in the Sapotinae (Ebenaceae and Sapotaceae). Another Afrotropical member of this group is represented in BMNH by five specimens, which are too badly damaged for description, standing under a Heslop-Harrison manuscript name.

A North American species, *T. diospyri* (Ashmead, 1881), is also known to develop on *Diospyros*. Although this species shows a general resemblance to those of the *obsoleta*-group and in particular to *gonjae* and *boxi*, its hindwings are more normally developed. It may represent the sister-species of the Old World group.

Trioza obsoleta (Buckton, 1900), described from India, and *Megatrioza swezeyi* Crawford, 1927, described from Samoa, clearly belong to this group; the South East Asian species *Trioza asiatica* Crawford, 1915 and *Megatrioza magnicauda* Crawford, 1919 probably belong here, but I have no material for examination. *Trioza diptera* Crawford, 1919, from Singapore, also has completely reduced hindwings but, from its description, this species appears to be more closely related to *Leptynoptera sulfurea* Crawford and both develop on *Calophyllum inophyllum* (Guttiferae).

Earlier authors almost certainly would have placed all these species in *Megatrioza* but as I have not examined the type-species, *M. armata* Crawford, I am not sure of the status of the genus.

Trioza afrobsoleta sp. n.

(Figs 13, 178–182)

'Psyllidengalle'; *Diospyros mespiliformis*; Rübsaamen, 1899: 271 (Eritrea [series not traced].)

Description. Adult. Integument shiny, sparsely covered with short setae. Head, in profile, strongly depressed from longitudinal axis of body, in dorsal view as wide as mesoscutum; occipital margin sharp; vertex pentagonal, rounded downwards, lateral concavities displaced posteriorly to occipital margin and greatly reduced, median suture weak; median ocellus hardly visible in dorsal view, frons small but visible between bases of genal cones in anterior view; genal cones in parallel plane to vertex, short, broadly rounded apically; antennal flagellum 1·66–1·94 times longer than head width in ♂ and 1·44–1·77 times longer in ♀, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with two long setae apically; clypeus with a pair of setae, ultimate rostral segment with a pair of setae. Thorax, in profile, moderately arched; pronotum hardly visible from above, strongly downcurved behind occiput; mesopraescutum, in profile, strongly rounded down to pronotum, in dorsal view with arcuate anterior margin; forewing elongate oval, narrowing to a rounded obtusangular apex, 2·46–2·87 times longer than wide, radular areas very narrow and attenuate, remainder of membrane devoid of spinules, veins bearing short setae, *R* branch obtusangular, *M* branching at or slightly distal to $Rs-Cu_{1a}$ line, *Cu* stem 2·0–2·7 times longer than Cu_{1b}, m_1 cell value 1·97–2·41, cu_1 cell value 1·42–2·05, claval suture reaching hind margin of wing very close to wing base; hindwing (Fig. 179) greatly reduced, scale-like, costal margin bearing one seta proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and a moderately long anterior lobe; hind tibia with a group of 3–4 small pointed tubercles basally, with one outer and two inner apical spurs. Abdomen with setae on tergites 3–7 in ♂ and 4–8 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 180–182; ♀ genital segment short, conical, ovipositor valves smooth.

Measurements (16 ♂, 10 ♀). Maximum width of head, ♂ 0·42–0·56, ♀ 0·48–0·54; length of antennal flagellum, ♂ 0·74–0·93, ♀ 0·75–0·88; length of ultimate rostral segment, ♂ and ♀ 0·09–0·15; length of forewing, ♂ 2·75–3·79, ♀ 3·01–3·93; length of hind tibia, ♂ 0·59–0·78, ♀ 0·65–0·79.

Fifth instar larva. Dorsal surface outline almost circular, about 1·1 times longer than wide. Antenna with six flagellomeres. Cephaloprothorax incompletely separated from rest of thorax which is entire. Forewing pad about 0·9 mm long, humeral lobe extending well forward of anterior margin of eye, hindwing pad greatly reduced and without sectasetae on lateral margin. Caudal plate about twice as wide as long, anus ventral and distant from posterior margin of abdomen. Truncate tubular sectasetae forming an even, dense marginal fringe, marginal sectasetae on cephaloprothorax longer than those on forewing pad and abdomen, postocular seta absent, sectasetae absent from dorsum.

Host plant. Larvae, which form pit galls on the lower leaf surface, and adults collected from *Diospyros mespiliformis* (Ebenaceae).

Holotype ♂, **Angola**: Roçadas, R. Cunene, 19–22.ii.1972, *Diospyros mespiliformis* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Angola**: 11 ♂, 18 ♀, same data as holotype; 17 ♂, 12 ♀, 3 mls N. Santa Clara, 30.iii.–1.iv.1972; 1 ♀, Bruco, 26–29.ii.1972, swept in riverine forest area (*D. Hollis*). **Tanzania**: 9 ♂, 5 ♀, Nachingwea, x.1953–iii.1954, trapped (*V. F. Eastop*). **Sudan**: larvae, SW. side Jebel Marra, Wadi Golol, 1.v.1981, *Diospyros mespiliformis*; 1 ♂, swept, 28.iv.1981 (*J. H. Martin*). **Nigeria**: 1 ♂, Bunga, 20.x.1956, *Salix ledermanni* (*V. F. Eastop*); 2 ♂, Ibadan, 4.vi.1961, yellow tray; 1 ♂, 2 ♀, 5–19.iv.1963; 1 ♂, 2.v.1963; 5 ♂, 8 ♀, 3–9.iv.1964 (*F. A. Squire*); 1 ♀, B.P. State, Gindiri, 28.x.1968 (*J. T. Medler*); 1 ♂, Zaria, Samaru, 24.xi.1970 (*J. C. Deeming*); 1 ♀, Lagos, Ikoyi, 7.iii.1975, at light (*M. A. Cornes*). **Ghana**: 1 ♀, Tafo, 29.v.1957 (*V. F. Eastop*). **Ivory Coast**: 2 ♂, 1 ♀, 10.iv.1969 (*A. Pollet*). (BMNH; MNHN; slide and dry mounted and stored in 80% ethanol.)

Comments. This species is very closely related to *T. obsoleta* (Buckton, 1900) which is known from India and Ceylon on *Diospyros melanoxylon* and *D. tomentosa*. The Indian species differs in having a longer and slightly sinuous *Rs*, and the paramere has two sclerotised teeth apically instead of the transverse ridge as found in the Africa species. This latter point of difference, although slight, appears very consistent in all specimens examined. *T. afrobsoleta* shows considerable variation in the length of the ultimate rostral segment through its geographical range, that of specimens from Angola and Tanzania being relatively longer than in specimens from Sudan and West Africa.

Trioza gonjae sp. n.

(Figs 38, 47, 183–187, 309, 310)

DESCRIPTION. Adult. Integument sparsely covered with long setae (Fig. 38). Longitudinal axis of head and body in one plane; head, from above, almost as wide as mesoscutum; occipital margin sharp; vertex pentagonal, with an irregular concavity on either side of a well-defined median suture; median ocellus visible from above, frons not visible between genae; genal cones well developed, elongate conical with rounded apices, densely setose, in profile their longitudinal axis is slightly inclined upwards from that of vertex, in dorsal view cones slightly convergent apically; antennal flagellum 1·87–2·00 times longer than head width in ♂ and 1·68–1·78 times longer in ♀, a single rhinarium present subapically on flagellomeres 2, 4, 6, and 7, apical flagellomere with a long pointed seta and a short truncate seta apically; clypeus prominent, with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax, in profile, weakly arched; pronotum narrow and inclined vertically down behind occiput, just visible in dorsal view; mesopraescutum, from above, longer than wide and with a subangular anterior margin, in profile anterior margin angularly bent down to pronotum; forewing elongate oval, strongly narrowing to acutangular apex, 2·98–3·29 times longer than wide, radular areas narrow, remainder of membrane devoid of spinules; veins bearing a few long setae in proximal third of wing, *R* branch a right-angle, *M* branching proximal to $Rs-Cu_{1a}$ line, *Cu* stem 2·36–3·21 times longer than Cu_{1b}, m_1 cell value 1·91–2·08, cu_1 cell value 1·96–2·63; hindwing greatly reduced and scale-like (Fig. 184); hind coxa (Fig. 47) with a well-developed meracanthus and a well-developed anterior lobe; hind tibia with a group of small pointed tubercles basally and one outer and two or three inner spurs apically. Abdomen with setae on tergites 3–7 in ♂ and 4 and 6–8 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 185–187; ♀ genital segment conical, dorsal surface of dorsal valve of ovipositor finely serrate apically.

Measurements (5 ♂, 4 ♀). Maximum width of head, ♂ 0·46–0·48, ♀ 0·47–0·51; length of antennal flagellum, ♂ 0·88–0·94, ♀ 0·81–0·91; length of ultimate rostral segment, ♂ 0·12–0·13, ♀ 0·12–0·15; length of forewing, ♂ 3·73–3·89, ♀ 4·01–4·37; length of hind tibia, ♂ 0·70–0·77, ♀ 0·71–0·78.

Fifth instar larva (Figs 309, 310). Dorsal surface outline elongate oval with clear indentations at anterior margin of eye and at base of abdomen, about 1·7 times longer than wide. Antenna 3-segmented (flagellum not divided). Cephaloprothorax separate from rest of thorax which is entire but does show partial separation of prothoracic sclerite (Fig. 309). Forewing pad about 0·9 mm long, humeral lobe extending almost to anterior margin of eye. Caudal plate about 0·75 times as long as wide, anus ventral and close to posterior margin of abdomen, anal pore area as in Fig. 310. Truncate tubular sectasetae of varying lengths forming a dense marginal fringe, a pointed postocular sectaseta or lanceolate seta present, dorsum bearing a sparse covering of tubular sectasetae.

HOST PLANT. Larvae and adults swept from *Diospyros squarrosus* (Ebenaceae); no galling of the host plant was observed and the larvae are apparently free-living.

Holotype ♂, **Tanzania**: S. Pare Mtns, hillside above Gonja, *c.* 3,000′, 12–16.vi.1974, *Diospyros squarrosus* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Tanzania**: 11 ♂, 10 ♀, larvae, same data as holotype; 1 ♀, Arusha NP, Ngurdoto Crater rim, *c.* 5,000′, 8.vi.1974 (*D. Hollis*). (BMNH; slide and dry mounted.)

Trioza boxi sp. n.

(Figs 188, 189, 311, 312)

DESCRIPTION. Adult. Similar to *gonjae*. Differs in that vertex has a longitudinal concavity on either side of median suture; genal cones subconical with broadly rounded apices which are not convergent; ultimate rostral segment shorter and with only one pair of setae. Forewing 2·95–2·99 times longer than wide; proximal part of $c+sc$ and cu_2 cells with brown pigmentation and membrane with a few scattered spinules in this area; *Cu* stem 2·45–2·52 times longer than Cu_{1b}, m_1 cell value 1·72–1·74, cu_1 cell value 2·9–3·0; hindwing (Fig. 189) greatly reduced and scale-like. ♂ proctiger less extended laterally; dorsal surface of dorsal valve of ovipositor smooth.

Measurements (1 ♂, 1 ♀). Maximum width of head, ♂ and ♀ 0·58; length of antennal flagellum, ♀ 1·03; length of ultimate rostral segment, ♂ and ♀ 0·1; length of forewing, ♂ 5·29, ♀ 5·35; length of hind tibia, ♂ 0·88, ♀ 0·85.

Fifth instar larva (Figs 311, 312). Very similar to *gonjae*. Dorsal surface outline less elongate, about 1·5 times longer than wide. Forewing pad about 1·5 mm long, humeral lobe extending forward just in front of anterior margin of eye. Caudal plate about 0·7 times as long as wide, anal pore area as in Fig. 312. Truncate

tubular sectasetae forming an even, dense marginal fringe, lanceolate postocular seta present, dorsal surface devoid of sectasetae.

HOST PLANT. Adults and larvae, collected on separate occasions, from *Diospyros canaliculata [=xanthochlamys]* (Ebenaceae).

Holotype ♂, **Ghana**: 'Gold Coast, Bunsu, 7.vii.1943, *Diospyros xanthochlamys*' (*H. E. Box*) (BMNH; slide mounted).

Paratypes. **Ghana**: 2 ♀, same data as holotype; larvae, 15.i.1943. (BMNH; slide and dry mounted.)

Trioza afrosersalisia sp. n.

(Figs 190–193, 313, 314)

DESCRIPTION. Adult. Integument sparsely covered with long setae. Head, in profile, slightly depressed from longitudinal axis of body, from above slightly narrower than mesoscutum; occipital margin sharp; vertex oval, evenly and smoothly concave and surrounded by a sharp, finely serrate ridge, integument within this depression shiny and devoid of setae, median suture just indicated; median ocellus just visible from above, frons completely covered by genae; genal cones moderately developed, conical, extending forward in parallel plane to vertex; antennal flagellum 1·75–2·00 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6, and 7, apical flagellomere with one short truncate seta and one very short truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax, in profile, weakly arched; pronotum hardly visible from above, in profile strongly rounded down behind occiput; mesopraescutum, in dorsal view, as long as wide and with a narrowly arcuate anterior margin, in profile strongly angled down to pronotum; forewing elongate oval, strongly narrowing to angular apex, 2·72–2·93 times longer than wide, radular areas very narrow, remainder of membrane devoid of spinules; veins bearing long setae in proximal half of wing, *R* branch acutangular, *M* branching at $Rs-Cu_{1a}$ line, *Cu* stem 3·29–4·38 times longer than Cu_{1b}, m_1 cell value 1·77–2·07, cu_1 cell value 2·47–3·38; forewing 2·14–2·32 times longer than hindwing, costal margin of hindwing with 4–5 setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and an incipient anterior lobe; hind tibia without or with a very small basal spine, with one outer and two inner apical spurs. Abdominal tergites without setae; ♂ proctiger, paramere and aedeagus as in Figs 191–193; ♀ genital segment short, conical, ovipositor valves smooth.

Measurements (7 ♂, 4 ♀). Maximum width of head, ♂ 0·48–0·52, ♀ 0·49–0·54; length of antennal flagellum, ♂ 0·93–1·04, ♀ 0·86–1·01; length of ultimate rostral segment, ♂ 0·08–0·10, ♀ 0·10; length of forewing, ♂ 3·40–3·71, ♀ 3·61–4·13; length of hind tibia, ♂ 0·70–0·73, ♀ 0·66–0·73.

Fifth instar larvae (Figs 313, 314). Dorsal surface outline oval, about 1·4 times longer than wide. Antenna with five flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 1·0 mm long, humeral lobe extending well forward of anterior margin of eye. Caudal plate about 0·6 times as long as wide, anus ventral and distant from posterior margin of abdomen, anal pore area as in Fig. 314. Truncate tubular sectasetae forming an even, dense marginal fringe, postocular seta absent, sectasetae absent from dorsum.

HOST PLANT. Larvae and adults collected from *Afrosersalisia* sp. (Sapotaceae); galling of the host plant was not noticed at the time the series, including the holotype, was collected.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., *c.* 3,000′, 19–27.vi.1974, *Afrosersalisia* sp. (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Tanzania**: 20 ♂, 11 ♀, larvae, same data as holotype. **South Africa**: 1 ♀, C.P., Mossel Bay, ix.1921; 1 ♂, 3 ♀, vi.–vii.1930 (*R. E. Turner*). (BMNH; slide and dry mounted.)

COMMENTS. *T. afrosersalisia* may be readily distinguished from other Afrotropical *Trioza* species by the peculiar form of the vertex. The species is tentatively placed in the *obsoleta*-group because of its reduced hindwings and the presence of an incipient anterior lobe on the hind coxa. Furthermore the host plant is related to *Diospyros*.

Trioza mimusops sp. n.

(Figs 194–197, 315, 316)

DESCRIPTION. Adult. Integument sparsely covered with long setae. Head, in profile, moderately depressed

from longitudinal axis of body, from above narrower than mesoscutum; occipital margin sharp; vertex rounded rectangular, with a concavity on either side of median suture which is clearly defined, frontal lobes not developed but a low transverse ridge is present; median ocellus clearly visible from above, frons completely covered by genae in anterior view; genal cones well developed, rounded conical, in profile in parallel plane to vertex; antennal flagellum 1·54–1·83 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with one short and one very short seta apically, both of which are truncate; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax, in profile, moderately arched; pronotum clearly visible from above, only its anterior margin downcurved behind occiput; mesopraescutum, from above, wider than long, its anterior margin arcuate, in profile gently rounded down to pronotum; forewing elongate oval, narrowing to an acutangular apex, 2·52–2·92 times longer than wide, radular areas narrow, remainder of membrane devoid of spinules, course of *R* and R_1 marked with brown pigment; veins bearing long setae in proximal third of wing, *R* branch acutangular, *M* branching distal to or, at most, at $Rs-Cu_{1a}$ line, *Cu* stem 2·60–4·57 times longer than Cu_{1b}, m_1 cell value 1·82–2·20, cu_1 cell value 2·00–2·93; forewing 1·99–2·17 times longer than hindwing, costal margin of hindwing with 2–6 setae proximal to costal break, no setae immediately distal to costal break and two curved setae adjacent to retinaculum; hind coxa with a well-developed meracanthus and an incipient anterior lobe; base of hind tibia swollen dorsally and bearing several small, blunt tubercles, with one outer and two inner spurs apically. Abdomen with setae on tergites 6 and 7 in ♂ and 6–8 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 195–197; ♀ genital segment short, conical, dorsal surface of dorsal valve of ovipositor weakly serrate apically, ventral surface of ventral valve smooth.

Measurements (6 ♂, 6 ♀). Maximum width of head, ♂ 0·54–0·59, ♀ 0·57–0·61; length of antennal flagellum, ♂ 0·90–1·06, ♀ 0·88–1·00; length of ultimate rostral segment, ♂ and ♀ 0·09–0·10; length of forewing, ♂ 3·59–4·08, ♀ 3·93–4·53; length of hind tibia, ♂ 0·61–0·79, ♀ 0·65–0·75.

Fifth instar larva (Figs 315, 316). Dorsal surface outline very broadly oval, about 1·3 times longer than wide. Antenna with five flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 0·62 mm long, humeral lobe strongly extended forward to anterior margin of cephaloprothorax. Caudal plate about 0·65 times as long as wide, anus ventral and distant from posterior margin of abdomen, anal pore area as in Fig. 316. Narrow, tubular, truncate sectasetae forming a moderately dense fringe on anterior margin of cephaloprothorax and caudal plate and a sparse fringe on the wing pads, postocular seta absent, sectasetae absent from dorsum.

Host plants. Adults and larvae collected from *Mimusops obovata* and *M. zeyheri*, adults only collected from *M. caffra* (Sapotaceae).

Holotype ♂, **South Africa**: Transvaal, Hartebeestpoort Dam, Bet El Park, 17.viii.1974, *Mimusops zeyheri* (*B. R. Pitkin*) (BMNH; dry mounted).

Paratypes. **South Africa**: 14 ♂, 12 ♀, same data as holotype; 7 ♂, 6 ♀, larvae, Natal, Durban Botanical Gardens, 23.viii.1974, *Mimusops obovata* (*B. R. Pitkin*); 1 ♀, Port St John, Pondoland, 1–11.vi.1923 (*R. E. Turner*); 5 ♂, 9 ♀, Transvaal, Rustenburg, 20.ii.1965, *Mimusops zeyheri*; 5 ♂, 8 ♀, larvae, 27–30.x.1966; 5 ♂, 5 ♀, larvae, 11–15.ix.1971; 1 ♀, 11–15.ix.1971, *Fagara capensis*; 15 ♂, 11 ♀, Pretoria, Hartebeestpoort, 20.v.1965, *Mimusops zeyheri*; 3 ♂, 3 ♀, 6.viii.1965; 2 ♂, 2 ♀, Natal, Umtentweni, 29.ix.1965, *Mimusops caffra*; 1 ♀, Umkomaas, 29.ix.–3.x.1965, *Bersama lucens* (*A. L. Capener*). (BMNH; NCI; slide and dry mounted and stored in 80% ethanol.)

Comment. This distinctive species is easily recognised by the shape, venation and pigmentation of the forewing (Fig. 194), and the unusual chaetotaxy of the abdominal tergites. It is tentatively placed in the *obsoleta*-group because the hindwing is only half the length of the forewing, the hind coxa has an incipient anterior lobe and the hind tibia has two inner apical spurs, and because of its host plant association.

The *cockerelli*-group

For a discussion of this group see p. 56.

Trioza capensis sp. n.

(Figs 27, 53, 225–228)

Description. Adult. Integument sparsely covered with short setae. Head, in profile, strongly depressed from longitudinal axis of body, from above narrower than mesoscutum; occipital margin sharp; vertex

trapezoidal, gently rounded down anteriorly, without frontal lobes or ridge, with a crescent-shaped depression on either side of the shallow median suture; median ocellus visible from above, frons visible in anterior view; genae slightly swollen ventrally; antennal flagellum 1·36–1·49 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, that of 2 with a large curved sense cone (Fig. 27), apical flagellomere with a moderately long and a short truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax moderately arched; pronotum clearly visible from above; mesopraescutum, from above, much wider than long, anterior margin broadly arcuate, in profile shallowly rounded down to pronotum; forewing elongate oval, strongly narrowing to rounded rectangular apex, 2·44–2·57 times longer than wide, radular areas narrow elongate, remainder of membrane devoid of spinules; veins bearing very short setae, *R* branch acutangular, *M* branching distal to $Rs-Cu_{1a}$ line, *Cu* stem 3·54–4·71 times longer than Cu_{1b}, m_1 cell value 1·20–1·33, cu_1 cell value 1·71–2·22; forewing 1·44–1·51 times longer than hindwing, costal margin of hindwing with 3–4 setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and a very small anterior lobe; hind tibia with a well-developed basal spine, a very well-developed preapical outer spur and two inner apical spurs (Fig. 53). Abdomen with setae on tergite 3 in ♂ and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 226–228; ♀ genital segment very short, rounded conical, ovipositor valves smooth.

Measurements (2 ♂, 3 ♀). Maximum width of head, ♂ 0·53–0·54, ♀ 0·50–0·52; length of antennal flagellum, ♂ 0·79, ♀ 0·68–0·77; length of ultimate rostral segment, ♂ and ♀ 0·09–0·10; length of forewing, ♂ 2·31–2·38, ♀ 2·54–2·72; length of hind tibia, ♂ 0·38, ♀ 0·38–0·40.

Larva unknown.

Host plants. Adults collected from *Lycium salinicola* and *Lycium ? tetrandrum* (Solanaceae).

Holotype ♂, **South Africa**: Cape Province, Aliwal North, xii.1922 (*R. E. Turner*) (BMNH; slide mounted).

Paratypes. **South Africa**: 1 ♀, same data as holotype; 1 ♀, 25 mls SSE. Merweville, 2.v.1972, *Lycium ? tetrandum* (*D. Hollis*); 1 ♀, Nuwerus, 10.xi.1971 (*J. G. Theron*); 1 ♂, 1 ♀, OFS, Philippolis, Vaalbank, 19–30.xi.1969, *Lycium salinicolum* (*A. L. Capener*). (BMNH; NCI; slide and dry mounted.)

Comments. *T. capensis* apparently belongs to the same species-group as the New World *Paratrioza cockerelli* (Sulc, 1909) and the Palaearctic species of *Paratrioza*, which all develop on solanaceous hosts. The paramere is very similar to *lycii* Loginova, 1970, described from Georgia and Tadzhikistan, but *capensis* may be distinguished by the structure of the rhinarium on the 2nd flagellomere, the development and displacement of the outer apical spur on the hind tibia and the form of the apical segment of the aedeagus. Furthermore *capensis* completely lacks genal cones and has a more primitive form of thorax, the *Paratrioza* species having the mesopraescutum more produced anteriorly.

Previous authors would have placed this species in *Paratrioza* but I am not sure of the validity of the genus and prefer to place *capensis* under *Trioza*.

The *etiennei*-group

A distinctive group of small species defined by the absence of genal cones, bifid sensilla associated with the antennal rhinaria, forewing with a broadly rounded apex, reduced meracanthi and a 3-segmented (at least partially) aedeagus. Six species are included: *etiennei, messaratina, seranistama, nestasimara, camerounensis* and *pitkini*. Host plants, both members of the Sapotaceae, are known for two of the species, and the only known larva, that of *etiennei*, is very distinctive (Fig. 317).

Trioza etiennei sp. n.

(Figs 46, 50, 198–201, 317, 318)

Description. Adult. Integument sparsely covered with very short setae. Head, in profile, at 90° to longitudinal axis of body, from above as wide as mesoscutum; occipital margin sharp; vertex pentagonal, rounded down to genae, with a median longitudinal ridge on either side of which is a parallel furrow, lateral margins raised and with anterolateral tubercles, median suture evanescing just above median ocellus;

latter not visible from above, frons visible in anterior view; genae smooth, rounded, without trace of cones; antennal flagellum short, 1·06–1·23 times longer than head width, a single subapical rhinarium present on flagellomeres 2, 4, 6 and 7, the proximal three each with a bifid sensillum, the distal one with a short conical sensillum, apical flagellomere with two long setae apically; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax, in profile, with mesopraescutum almost flat; pronotum strongly rounded down behind occiput, with a sharp median tubercle, and a blunt tubercle at each dorsolateral margin (*cf.* Fig. 203); mesopraescutum much wider than long, its anterior margin broadly arcuate; forewing elipsoid with broadly rounded apex, leading edge almost straight, 2·32–2·65 times longer than wide, radular areas broad, claval suture bordered with spinules but remainder of membrane devoid of spinules; veins bearing short setae, *R* branch acutangular, *M* branching proximal to $Rs-Cu_{1a}$ line, *Cu* stem 1·60–2·33 times longer than Cu_{1b}, m_1 cell value 1·25–1·46, cu_1 cell value 1·07–1·38; forewing 1·14–1·22 times longer than hindwing, costal margin of hindwing with up to two setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa (Fig. 46) with a reduced meracanthus and without anterior lobe; hind tibia without basal tubercles, with one outer and two inner apical spurs and with a double vertical row of up to five thickened setae (Fig. 50); hind basitarsus elongate. Abdomen with setae on tergites 2–7 in ♂ and 3–8 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 199–201; ♀ genital segment elongate conical, with apical half strongly elongate, ovipositor valves smooth.

Measurements (10 ♂, 5 ♀). Maximum width of head, ♂ 0·28–0·30, ♀ 0·31–0·33; length of antennal flagellum, ♂ 0·32–0·37, ♀ 0·33–0·38; length of ultimate rostral segment, ♂ 0·07–0·08, ♀ 0·08–0·09; length of forewing, ♂ 0·99–1·14, ♀ 1·14–1·32; length of hind tibia, ♂ 0·29–0·36, ♀ 0·32–0·37.

Fifth instar larva (Figs 317, 318). Dorsal surface outline elongate oval, about 2·1 times longer than wide, head and thorax clearly differentiated from abdomen, latter with a median posterior prolongation. Antenna with three flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 0·42 mm long, humeral lobe weakly extended forward but not reaching hind margin of eye. Caudal plate about 1·35 times longer than wide, including posterior prolongation; anus ventral and distant from posterior margin of abdomen, anal pore area as in Fig. 318. Truncate tubular sectasetae inserted on elongate basal tubercles, and very small lanceolate setae forming a sparse marginal fringe, a single truncate tubular postocular sectaseta mounted on a basal tubercle present, arrangement of sectasetae on dorsum as in Fig. 317.

HOST PLANT. Larvae and adults collected from *Malacantha alnifolia* (Sapotaceae).

Holotype ♂, **Senegal**: Djebelor, 26.xii.1979, *Malacantha alnifolia* (*J. Etienne*) (BMNH; slide mounted).

Paratypes. **Senegal**: 50 ♂, 50 ♀, larvae, same data as holotype; 10 ♂, 10 ♀, larvae, Ziguinchor, 20.vii.1981. **Ghana**: 2 ♂, 1 ♀, Tafo, v.1957, yellow tray. **Nigeria**: 1 ♂, 1 ♀, Ibadan, Moor Plntn, 11.vii.1956, yellow tray (*V. F. Eastop*); 1 ♂, vi.1957; 11 ♂, 6 ♀, iv.1960; 4 ♂, 3 ♀, 19–27.iv.1961 (*F. A. Squire*); 1 ♀, Ikom, 11–12.ii.1957 (*V. F. Eastop*). (BMNH; MNHN; slide mounted and stored in 80% ethanol.)

COMMENT. *T. etiennei* and *messaratina* seem to be a sister pair, distinguished from the rest of the group by the presence of tubercles or projections on the pronotum. The two species may be separated from one another by the characters given in key couplet 23.

Trioza messaratina sp. n.

(Figs 202–206)

DESCRIPTION. Adult. Very similar to *etiennei*. Median longitudinal ridge and parallel furrows of vertex less well developed and median suture weakly indicated just above median ocellus; ultimate rostral segment without setae; antennal flagellum very short, 0·69 times as long as head width, all rhinaria with bifid sensilla although that of flagellomere 7 much shorter than the others. Pronotum as in Fig. 203; forewing (Fig. 202) 2·95 times longer than wide; spinules present in posterior part of *c+sc*, completely covering cu_2 and anal cell, along hind margin from cu_1 to point at which *Rs* reaches wing margin; *Cu* stem 4·55 times longer than Cu_{1b}, m_1 cell value 1·62, cu_1 cell value 2·89; hind tibia without vertical row of thickened setae, hind basitarsus not elongate. ♂ proctiger, paramere and aedeagus as in Figs 204–206; ♀ unknown.

Measurements (1 ♂). Maximum width of head, 0·29; length of antennal flagellum, 0·20; length of ultimate rostral segment, 0·06; length of forewing, 0·96; length of hind tibia, 0·23.

Larva and host plant unknown.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., *c.* 3,000′, 19–27.vi.1974, yellow tray (*D. Hollis*) (BMNH; slide mounted).

Trioza seranistama sp. n.

(Figs 207–211)

DESCRIPTION. Adult. Similar to *etiennei*. Head more rounded; vertex without longitudinal ridge and associated furrows, median suture present and complete to occiput; antennal flagellum short, 0·86–0·91 times as long as head width, with a single subapical rhinarium present on flagellomeres 2, 4, 6, and 7, each with a short bifid sensillum; ultimate rostral segment with one pair of setae. Pronotum without median and lateral tubercles; forewing (Fig. 207) 2·37–2·49 times longer than wide, radular areas weak and broad, spinules present in apical areas of cells r_2, m_1, m_2, cu_1 and occupying most of cu_2; veins bearing long setae, *Cu* stem 1·92–2·72 times longer than Cu_{1b}, m_1 cell value 1·23–1·39, cu_1 cell value 1·00–1·24; forewing 1·19–1·21 times longer than hindwing, costal margin of hindwing without setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind tibia without vertical rows of thickened setae; hind basitarsus short. Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 208–210; apical half of ♀ genital segment (Fig. 211) elongate.

Measurements (3 ♂, 1 ♀). Maximum width of head, ♂ 0·32–0·34, ♀ 0·36; length of antennal flagellum, ♂ 0·28–0·31, ♀ 0·31; length of ultimate rostral segment, ♂ 0·09, ♀ 0·10; length of forewing, ♂ 1·29–1·38, ♀ 1·51; length of hind tibia, ♂ 0·31–0·33, ♀ 0·34.

Larva and host plant unknown.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res sta., *c.* 3,000′, 19–27.vi.1974, yellow tray (*D. Hollis*) (BMNH; slide mounted).

Paratypes. 2 ♂, 1 ♀, same data as holotype (BMNH; slide mounted).

Trioza nestasimara sp. n.

(Figs 212, 213)

DESCRIPTION. Adult. Very similar to *seranistama*. Differs in that rhinarium on flagellomere 4 bears a long bifid sensillum. Forewing 2·58 times longer than wide; *Cu* stem 1·76 times longer than Cu_{1b}, m_1 cell value 1·43, cu_1 cell value 0·92; forewing 1·15 times longer than hindwing. Paramere and aedeagus as in Figs 212, 213, apical segment of aedeagus more clearly divided.

Measurements (1 ♂). Maximum width of head, 0·35; length of antennal flagellum, 0·31; length of ultimate rostral segment, 0·08; length of forewing 1·38; length of hind tibia, 0·31.

Larva and host plant unknown.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., *c.* 3,000′, 19–27.vi.1974, yellow tray (*D. Hollis*) (BMNH; slide mounted).

COMMENT. The specimen upon which this species is based was collected in the same yellow tray, during the same period as the type-series of *seranistama* and, possibly, it is an aberrant specimen of the latter. However, it would be most unusual for a psyllid species to have such variable antennal and ♂ genitalia structure, and for this reason two species are recognised here.

Trioza camerounensis sp. n.

(Figs 214, 215)

DESCRIPTION. Adult. Very similar to *seranistama*. Antennal flagellum 1·11–1·23 times longer than head width, each rhinarium with a long bifid sensillum; ultimate rostral segment with two pairs of setae. Forewing 2·66–2·75 times longer than wide, spinules present in cells m_1, m_2, cu_1 and cu_2; veins bearing short setae, *Cu* stem 1·67–1·78 times longer than Cu_{1b}, m_1 cell value 1·28–1·35, cu_1 cell value 1·04–1·29; forewing 1·34–1·37 times longer than hindwing, costal margin of hindwing with one seta proximal to costal break. ♂ paramere and aedeagus as in Figs 214, 215, apical segment of aedeagus subdivided.

Measurements (1 ♂, 2 ♀). Maximum width of head, ♂ 0·31, ♀ 0·35; length of antennal flagellum, ♂ 0·38, ♀ 0·39–0·42; length of ultimate rostral segment, ♂ and ♀ 0·09; length of forewing, ♂ 1·63, ♀ 1·86–1·89; length of hind tibia, ♂ 0·29, ♀ 0·31–0·34.

Larva and host plant unknown.

Holotype ♂, **Cameroun**: Bamenda, 25–31.i.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. **Cameroun**: 2 ♀, Bamenda, 21–24.i.1957, yellow tray (*V. F. Eastop*) (BMNH; slide mounted).

Trioza pitkini sp. n.

(Figs 26, 216–218)

DESCRIPTION. Adult. Integument sparsely covered with very short setae. Head, in profile, slightly depressed from longitudinal axis of body; occipital margin sharp; vertex pentagonal with a weak concavity on either side of median suture, frontal lobes moderately developed; median ocellus not visible from above, frons hidden by genae which are slightly swollen but without cones; antennal flagellum short, 1·03–1·24 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6, and 7, that on 2 with a bifid sensillum (Fig. 26), apical flagellomere with two long setae apically; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax weakly arched; anterior margin of pronotum weakly downcurved behind occiput; mesopraescutum, from above, about as long as wide and with a broadly arcuate anterior margin; forewing (Fig. 216) elongate oval with rounded apex, 2·97–3·10 times longer than wide, radular areas broad, spinules present below $R+M+Cu$ stem and M stem, this area also brown pigmented apart from hyaline areas on either sides of apices of M_{3+4}, Cu_{1a} and Cu_{1b}; veins with short setae, R branch acutangular, M branching distal to $Rs-Cu_{1a}$ line, Cu stem 3·09–3·63 times longer than Cu_{1b}, m_1 cell value 1·11–1·22, cu_1 cell value 2·22–2·74; forewing 1·26–1·31 times longer than hindwing, costal margin of hindwing with one seta proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a moderately developed meracanthus and without anterior lobe; hind tibia without basal spine, with one outer and two inner apical spurs; hind basitarsus short. Abdomen with setae on tergites 2–7 in ♂ and 3–8 in ♀; ♂ paramere and aedeagus as in Figs 217, 218; ♀ genital segment narrowed strongly in apical half and elongate, ovipositor valves smooth.

Measurements (4 ♂, 3 ♀). Maximum width of head, ♂ 0·28–0·29, ♀ 0·31; length of antennal flagellum, ♂ 0·33–0·36, ♀ 0·32–0·33; length of ultimate rostral segment, ♂ 0·07–0·09, ♀ 0·08–0·09; length of forewing, ♂ 1·43–1·53, ♀ 1·65–1·71; length of hind tibia. ♂ 0·23–0·26, ♀ 0·25–0·26.

Larva unknown.

HOST PLANT. Adults collected from *Chrysophyllum viridifolium* (*?pruiniforme*) (Sapotaceae).

Holotype ♂, **Kenya**: Nairobi Arboretum, *c.* 5,400′, 25–26.vii.1974, *Chrysophyllum viridifolium* (*?pruiniforme*) (*D. Hollis* (BMNH; dry mounted).

Paratypes. 32 ♂, 15 ♀, same data as holotype (BMNH; NMK; slide and dry mounted and stored in 80% ethanol).

COMMENT. *T. pitkini* may be readily distinguished from other members of the *etiennei*-group by the shape, pattern and venation of the forewing (Fig. 216).

The *glabea*-group

Differs from the *etiennei*-group in that the aedeagus is 2-segmented with the apical segment thickened basally, and the forewing has a rounded acutangular apex. Two species, *glabea* and *usambarica*, are included but larvae and host plants are unknown.

Trioza glabea sp. n.

(Figs 219–222)

DESCRIPTION. Adult. Integument sparsely covered with very short setae. Median suture of vertex present and complete; genae rounded, without cones; antennal flagellum 1·61–1·70 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, those on 2 and 7 with a short conical sensillum, those on 4 and 6 with a long bifid sensillum, apical flagellomere with two long subequal setae apically; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Forewing (Fig. 219) elongate elipsoid with a rounded acutangular apex, 2·88–2·92 times longer than wide, radular areas narrow triangular, membrane with spinules at distal ends of cells r_2 and m_2, almost completely filling m_1 and cu_1 and following the course of claval suture; veins bearing moderately dense rows of short setae, R branch acutangular, M branching proximal to $Rs-Cu_{1a}$ line, Cu stem 0·60–0·64 times as long as Cu_{1b}, m_1 cell value 1·59–1·62, cu_1 cell value 0·80–0·85; forewing 1·44–1·48 times longer than hindwing, costal margin of hindwing without setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and an incipient anterior lobe; hind tibia with a small basal spine and one outer and two inner apical spurs. Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 220–222, apical segment of aedeagus with a

heavily sclerotised and bilobed base; ♀ genital segment short, conical, dorsal surface of dorsal valve of ovipositor weakly serrate apically.

Measurements (1 ♂, 1 ♀). Maximum width of head, ♂ 0·40, ♀ 0·44; length of antennal flagellum, ♂ 0·68, ♀ 0·71; length of ultimate rostral segment, ♂ 0·10, ♀ 0·11; length of forewing, ♂ 2·48, ♀ 2·82; length of hind tibia, ♂ and ♀ 0·39.

Larva and host plant unknown.

Holotype ♂, **Angola**: 7 mls W Gabela, 16–18.iii.1972, at light (*D. Hollis*) (BMNH; slide mounted).

Paratypes. **Angola**: 1 ♀, same data as holotype. **Zaire** ('Congo Belge'): 1 ♀, P.N.G., Miss. H. de Saeger, Pidigala, 23.iv.1952 (*H. de Saeger*). (BMNH; MRAC; slide mounted.)

Comments. *T. glabea* and *usambarica* are obviously closely related and I regard them as a sister pair. Both lack genal cones, have bifid sensilla on the antennal rhinaria, and the apical segment of the aedeagus has a thickened base. The presence of bifid sensilla suggests a possible sister-group relationship with the *etiennei*-group.

A third species belonging to this group is represented by four specimens, from Zaire, deposited in MRAC, but this material is too badly damaged for description.

Trioza usambarica sp. n.

(Figs 223, 224)

Description. Adult. Very similar to *glabea*. Integument more densely covered with slightly longer setae. Antennal flagellum 1·54 times longer than head width. Forewing with r_2 devoid of spinules; veins bearing slightly longer setae, *Cu* stem 0·66–0·73 times as long as Cu_{1b}, m_1 cell value 1·57–1·58, cu_1 cell value 0·74–0·86. ♂ paramere and aedeagus as in Figs 223, 224, apical segment of aedeagus with a less expanded base; dorsal surface of dorsal valve of ovipositor smooth.

Measurements (1 ♂, 1 ♀). Maximum width of head, ♂ 0·46, ♀ 0·51; length of antennal flagellum, ♂ 0·71 (♀ damaged); length of ultimate rostral segment, ♂ 0·13, ♀ 0·14; length of forewing, ♂ 2·64, ♀ 2·95; length of hind tibia, ♂ 0·41, ♀ 0·44.

Larva and host plant unknown.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., *c.* 3,000′, 19–27.vi.1974, yellow tray (*D. Hollis*) (BMNH; slide mounted).

Paratype. **Tanzania**: 1 ♂, similar data as holotype but swept (BMNH; slide mounted).

Ungrouped species

Twelve species are described in this section. Some may be grouped together in pairs on the basis of overall similarity due to common possession of characters in the primitive state. The species are ordered alphabetically and each may represent a distinct species-group.

Trioza ficiola sp. n.

(Figs 229–232, 319, 320)

Description (only slide-mounted material available for study). Adult. Integument sparsely covered with moderately long setae. Head with broadly conoid, well-developed genal cones; antennal flagellum 1·27–1·35 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with one long and one short and truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with several pairs of setae. Forewing elongate elipsoid, strongly narrowing distally to a rounded obtusangular apex, 2·52–2·92 times longer than wide, radular areas narrow triangular, remainder of membrane devoid of spinules; veins bearing short setae, *R* branch acutangular, *M* branch distal to $Rs-Cu_{1a}$ line, *Cu* stem 1·21–1·53 times longer than Cu_{1b}, m_1 cell value 1·53–1·64, cu_1 cell value 1·67–2·20; forewing 1·73–1·78 times longer than hindwing, costal margin of hindwing with 0–2 setae proximal to costal break, setae distal to costal break weakly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with a weak basal tubercle bearing several small conical spines, with one outer and three inner apical spurs. Abdomen with setae on tergites 2 and 3 in ♂, and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 230–232; ♀ genital segment very short, conoid, subgenital plate truncate apically, ventral surface of ventral valve of ovipositor saw-like and dorsal surface serrate apically.

Measurements (3 ♂, 1 ♀). Maximum width of head, ♂ 0·62–0·66, ♀ 0·66; length of antennal flagellum, ♂ 0·86–0·89, ♀ 0·84; length of ultimate rostral segment, ♂ and ♀ 0·11; length of forewing, ♂ 4·01–4·11, ♀ 4·40; length of hind tibia, ♂ 0·64–0·65, ♀ 0·64.

Fifth instar larva (Figs 319, 320). Dorsal surface outline almost circular, about 1·1 times longer than wide. Antenna about 0·3 mm long (segmentation not clear in specimens available). Cephaloprothorax separated from rest of thorax which is entire. Forewing pad 0·92 mm long, humeral lobe extended forward beyond anterior margin of eye. Caudal plate about 0·5 times as long as wide, anus ventral and distant from posterior margin of abdomen, anal pore area as in Fig. 320. Elongate truncate tubular sectasetae forming a dense, entire marginal fringe, post-ocular seta absent, sectasetae absent from dorsum.

Host plant. Adults and larvae collected from *Ficus* sp. (Moraceae). There is no information as to whether or not the larvae form pit galls on the host plant but this is highly likely judging from their shape and the arrangement of sectasetae.

Holotype ♂, **Mozambique**: Musape River Valley, 7.vii.1968, *Ficus* sp. (*C. J. Hodgeson*) (NCI; slide mounted).

Paratypes. 2 ♂, 1 ♀, larvae, same data as holotype (NCI; BMNH; slide mounted).

Comments. Apart from the male paramere and aedeagus this species has few diagnostic features. It resembles species of the *erytreae*-group but the venation of the forewing has a higher m_1 cell value and a lower cu_1 cell value, and the structure of the female ovipositor is more derived than that of other members of the group.

Trioza fuscivena sp. n.

(Figs 233–236)

Description. Adult. Integument sparsely covered with moderately long hairs. Head, in profile, slightly depressed from longitudinal axis of body, from above at least as wide as mesoscutum; occipital margin obtuse; vertex flattened but deeply divided anteriorly by median suture, frontal lobes weakly developed; median ocellus not visible from above, frons just visible in anterior view; genal cones narrow, conical, well developed, in profile depressed strongly from plane of vertex; antennal flagellum 1·59–1·98 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with two subequal terminal setae, the shorter with a truncate apex; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax weakly arched; pronotum, from above, with a rhomboid dorsal disc and narrowing strongly on each side; mesopraescutum, from above, longer than wide, anterior margin strongly arcuate, in profile strongly rounded down to pronotum; forewing elongate elipsoid, narrowing to rounded acutangular apex, 2·65–2·92 times longer than wide, membrane devoid of spinules apart from narrow triangular radular areas, course of *R* stem and R_1 and bases of *M* stem and *Cu* stem brown pigmented; veins sparsely clothed with moderately long hairs in basal half of wing, *R* branch acutangular, *M* branch distal to $Rs-Cu_{1a}$ line, *Cu* stem 1·51–1·77 times longer than Cu_{1b}, m_1 cell value 1·07–1·26, cu_1 cell value 1·86–2·08; forewing 1·66–1·78 times longer than hindwing, costal margin of hindwing with 4–7 setae proximal to costal break, setae distal to costal break sparse but clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with 3–4 small but clearly developed spines, with one outer and two inner apical spurs. Abdomen with setae on tergite 3 in ♂, and tergite 4 in ♀; ♂ proctiger very weakly expanded laterally, paramere and aedeagus as in Figs 234, 235; ♀ genital segment (Fig. 236) short, conoid, proctiger strongly downcurved apically, subgenital plate with truncate posterior margin, lower valve of ovipositor with three dorsolateral transverse ridges apically.

Measurements (4 ♂, 2 ♀). Maximum width of head, ♂ 0·50–0·54, ♀ 0·54–0·56; length of antennal flagellum, ♂ 0·94–1·05, ♀ 0·86–0·93; length of ultimate rostral segment, ♂ 0·07, ♀ 0·08; length of forewing, ♂ 3·25–3·46, ♀ 3·76–3·89; length of hind tibia, ♂ 0·66–0·70, ♀ 0·68–0·70.

Larva and host plant unknown.

Holotype ♂, **Cameroun**: Bamenda, i–ii.1957, yellow trays (*V. F. Eastop*) (BMNH; slide mounted).

Paratypes. 4 ♂, 2 ♀, same data as holotype (BMNH; slide and dry mounted).

Comment. This species is superficially similar to *nachingweae* (p. 49), principally because of the forewing pigmentation. However, the third flagellomere is not greatly reduced and *fuscivena* is not considered a member of the *neoboutonia*-group. Other differences from *nachingweae* may

be found in the short ultimate rostral segment, the longer setae on the forewing veins and the form of the male and female genitalia (Figs 234–236). No close association with any other species can be found.

Trioza ghanaensis sp. n.

(Figs 28, 237–240)

Description. Adult. Integument sparsely covered with very short setae. Head, from above, almost as wide as mesoscutum, in profile depressed at 90° from longitudinal axis of body; vertex pentagonal, flattened dorsally, rounded down to frons, with sharp occipital margins and clearly defined median suture, lateral concavities weak, frontal lobes absent; median ocellus not visible from above, frons just visible in anterior view; genae rounded, without cones; antennal flagellum 1·44–1·47 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, those on 2 and 7 with an oval sense cone, those on 4 and 6 each with a long bifid sense cone, apical flagellomere with two long subequal terminal setae; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax strongly arched; pronotum strongly curved down behind occiput; mesopraescutum, from above, almost as long as wide, anterior margin broadly arcuate and strongly rounded down to pronotum; forewing elongate elipsoid, strongly narrowing to obtusangular apex, 2·54–2·55 times longer than wide, radular areas elongate and narrow, rest of membrane devoid of spinules apart from small area at base of claval suture; veins bearing short setae, *R* branch acutangular, *M* branch proximal to $Rs-Cu_{1a}$ line, *Cu* stem 0·36–0·42 times as long as Cu_{1b}, m_1 cell value 2·09–2·34, cu_1 cell value 0·75–0·82; forewing 1·74–1·80 times longer than hindwing, costal margin of hindwing with 3–6 setae proximal to costal break, 10–12 setae immediately distal to costal break and 4–6 setae adjacent to retinaculum; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with a pair of unequally developed basal tubercles and one outer and two inner apical spurs. Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 238–240; ♀ genital segment conical, dorsal valves of ovipositor serrate apically.

Measurements (2 ♂, 2 ♀). Maximum width of head, ♂ 0·73–0·75, ♀ 0·75–0·78; length of antennal flagellum, ♂ damaged, ♀ 1·08–1·15; length of ultimate rostral segment, ♂ 0·22, ♀ 0·23; length of forewing, ♂ 5·27–5·35; ♀ 5·64–5·81; length of hind tibia, ♂ 0·90, ♀ 0·91–0·92.

Larva unknown.

Host plant. Adults collected 'in severely galled young terminal leaves of *Malacantha* sp.' (Sapotaceae).

Holotype ♂, **Ghana**: Tafo, xii.1942, on *Malacantha* sp. (*H. E. Box*) (BMNH; slide mounted).

Paratypes. **Ghana**: 1 ♂, 3 ♀, same data as holotype. **Zaire** ('Congo Belge'): 4 ♀, P.N.A., Nyasheke (vol. Nyamuragira), 1820 m, 14–26,vi.1935 (*G. F. de Witte*). (BMNH; MRAC; slide and dry mounted.)

Comment. See under *tenuis* (p. 67).

Trioza guiera sp. n.

(Figs 241–244, 321, 322)

Description. Adult. Integument covered with moderately long setae. Head, in profile, slightly depressed from longitudinal axis of body, from above slightly narrower than mesoscutum; occipital margin sharp; vertex with anterior margin incised by median suture, latter with an irregular concavity on either side dorsofrontally; median ocellus visible from above, frons visible in anterior view; genal cones very short, rounded; antennal flagellum short, 0·9–1·21 times as long as head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with a long pointed seta and a short truncate seta terminally; clypeus with a pair of weak setae, ultimate rostral segment long, devoid of setae. Thorax weakly arched; pronotum visible from above, its anterior margin rounded down behind occiput; mesopraescutum, from above, wider than long, with broadly arcuate anterior margin, in profile strongly downcurved to pronotum; forewing elipsoid, with rounded apex, 2·25–2·57 times longer than wide, membrane densely covered with spinules, radular areas broadly triangular; veins bearing long setae at least in proximal half of wing, *C+Sc* thickened at base, *R* branching from *R+M+Cu* slightly proximal to *Cu*, *R* branch acutangular, *M* branch distal to $Rs-Cu_{1a}$ line, *Cu* stem 0·93–1·79 times as long as Cu_{1b}, m_1 cell value 1·06–1·32, cu_1 cell value 1·26–1·7; forewing 1·41–1·56 times longer than hindwing, costal margin of hindwing with 3–4 setae proximal to costal break, no setae immediately distal to costal break and 2–3 setae adjacent to retinaculum; hind coxa with a well-developed meracanthus and without anterior lobe; hind

tibia with a group of 2–3 very small spines basally and without strongly developed apical spurs. Abdomen with setae on tergites 2–7 in ♂ and 3–8 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 242–244; ♀ genital segment short, conical, apex of proctiger upcurved and hook-like, valves of ovipositor smooth.

Measurements (10 ♂, 10 ♀). Maximum width of head, ♂ 0·40–0·45, ♀ 0·43–0·47; length of antennal flagellum, ♂ 0·37–0·51, ♀ 0·41–0·50; length of ultimate rostral segment, ♂ 0·10–0·13, ♀ 0·11–0·13; length of forewing, ♂ 1·62–1·84, ♀ 1·86–2·14; length of hind tibia, ♂ 0·27–0·31, ♀ 0·30–0·34.

Fifth instar larva (Figs 321, 322). Dorsal surface outline oval, about 1·4 times longer than wide, with indentations on either side at posterior margin of eye and at base of abdomen, posterior margin of abdomen with a deep indentation medially. Antenna with 4–5 flagellomeres. Cephaloprothorax separate from rest of thorax which is entire. Forewing pad about 0·37 mm long, humeral lobe weakly extending forward to posterior margin of eye. Caudal plate about 0·65 times as long as wide, anus apico-dorsal, anal pore area as in Fig. 322. Pointed conical sectasetae of unequal length forming an uneven dense marginal fringe interrupted posteromedially; blunt conical sectasetae present on either side of dorsal mid line from cephaloprothoracic suture to posterior margin of abdomen; a single conical sectaseta present on each lateral margin of the abdominal tergite immediately anterior to caudal plate.

Host plant. Adults and larvae collected from *Guiera senegalensis* (Combretaceae). The larvae are apparently free-living and one sample collected was associated with a species of the ant genus *Crematogaster*.

Holotype ♂, **Senegal**: Manpalago, 12.55N/16.00W, 13.i.1981, *Guiera senegalensis* (*J. Etienne*) (BMNH; dry mounted).

Paratypes. **Senegal**: 43 ♂, 31 ♀, larvae, same data as holotype; 7 ♂, 7 ♀, numerous larvae, Goudemp, 23.vi.1981, *Guiera senegalensis* (*J. Etienne*). **Gambia**: 2 ♂, 2 ♀, larvae (*V. F. Eastop*). **Chad**: 5 ♀, larvae, Bebedjia 8.40N/16.33E, 10.xi.1974 (*R. M. Bink-Moenen*). **Sudan**: 15 ♂, 14 ♀, larvae, 50 km W. El Obeid, 19.iv.1981, *Guiera senegalensis*, tended by *Crematogaster* sp.; 6 ♂, 13 ♀, larvae, 140 km W. El Obeid, 21.iv.1981; 9 ♂, 8 ♀, larvae S. Darfur, Ed Da'ein, 3.v.1981; 1 ♂, 1 ♀, larvae, Ed Da'ein to Babanusa Road, 4.v.1981; larvae, 40 km SW. El Muglad, 6.v.1981 (*J. H. Martin*). (BMNH; MNHN; slide and dry mounted and stored in 80% ethanol.)

Comments. The shape and venation of the forewing (Fig. 241) and the dense complete covering of spinules on the membrane serve to distinguish this species from other Afrotropical triozids. Furthermore the anus of the 5th instar larva is in a dorsal position, possibly to facilitate ant-tending.

Trioza karroo sp. n.

(Figs 51, 245–248)

Description. Adult. Integument sparsely covered with short setae. Head, in profile, moderately depressed from longitudinal axis of body, from above narrower than mesoscutum; occipital margin obtuse but well defined; vertex with a well-defined concavity on either side of median suture, frontal lobes weakly developed; median ocellus visible from above, frons completely covered by genal cones, latter well developed and with rounded apices, their longitudinal axis parallel with but not in same plane as vertex; antennal flagellum 1·89–2·16 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with one long and one short and truncate seta terminally; clypeus prominent and bearing a pair of setae, ultimate rostral segment without setae. Thorax weakly arched; pronotum clearly visible from above, its anterior margin rounded down behind occiput; mesopraescutum, from above, slightly wider than long, anterior margin broadly arcuate, in profile angled down to pronotum; forewing (Fig. 245) elongate, narrow, rounded apically, 3·09–3·23 times longer than wide, membrane with a broad band of brown pigmentation extending across the longitudinal axis of the wing, following the course of $R+M+Cu$, M stem and M_{1+2} and extending across posterior half of wing, evenly spinuled and with diffuse radular areas; veins bearing short setae, R branch acutangular, M branch at $Rs-Cu_{1a}$ line, Cu stem 1·10–2·26 times longer than Cu_{1b}, m_1 cell value 1·58–1·87, cu_1 cell value 1·47–1·79; forewing 1·23–1·32 times longer than hindwing, costal margin of hindwing bearing two setae proximal to costal break, setae distal to costal break not clearly divided into two groups; hind coxa with a well-defined meracanthus and without anterior lobe; hind tibia with a group of small tubercles on a raised bulge basally, without well-defined apical spurs but with an incomplete ring of thickened setae (Fig. 51). Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger and aedeagus as in Figs 246, 247 (parameres

damaged in holotype); ♀ genital segment (Fig. 248) short, conical, proctiger, in profile, with a prominent bulge posterior to anus and narrowing strongly to apex, ovipositor valves smooth.

Measurements (1 ♂, 6 ♀). Maximum width of head, ♂ 0·43, ♀ 0·41–0·46; length of antennal flagellum, ♂ 0·92, ♀ 0·85–0·98; length of ultimate rostral segment, ♂ 0·07, ♀ 0·08–0·09; length of forewing, ♂ 2·18, ♀ 2·45–2·63; length of hind tibia, ♂ 0·36, ♀ 0·36–0·40.

Larva and host plant unknown.

Holotype ♂, **South Africa**: C.P., Grabouw, 6.i.1971, swept (*J. G. Theron*) (NCI; slide mounted).

Paratypes. **South Africa**: 4 ♀, same data as holotype; 4 ♀, Ceres, iv.1925 (*R. E. Turner*). (BMNH; NCI; slide and dry mounted.)

Comments (see also p. 64). *T. karroo* is easily recognised by the pigmentation of the forewing (Fig. 245) and the absence of hind tibial spurs. The male genitalia are not particularly distinctive but the form of the female proctiger (Fig. 248) is very unusual.

Trioza laingi sp. n.

(Figs 249–253)

Description. Adult. Body sparsely covered with short setae, genal cones and legs bearing longer setae. Head, in profile, depressed almost at 90° to longitudinal axis of body, from above narrower than mesoscutum; occipital margin obtuse but defined; vertex with a well-developed concavity on either side of median suture which is deeper towards median ocellus, frontal lobes not developed; median ocellus not visible from above, frons completely covered by genae; genal cones well developed, in profile depressed from axis of vertex; antennal flagellum 1·74 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with one long and one short and truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with two pairs of setae. Thorax weakly arched; pronotum clearly visible from above and rounded down behind occiput; mesopraescutum, from above slightly wider than long, anterior margin broadly arcuate, in profile gently rounded down to pronotum; forewing (Fig. 249) elongate oval with rounded apex, 2·83–3·16 times longer than wide, membrane with an even brown pigmentation extending over posterior half of wing from the line of $R+M+Cu$, M stem and M_{1+2}, evenly covered with spinules and with diffuse radular areas; veins bearing short setae, R branch acutangular, M branching at or proximal to $Rs-Cu_{1a}$ line, Cu stem 1·45–1·86 times longer than Cu_{1b}, m_1 cell value 1·19–1·22, cu_1 cell value 1·07–1·40; forewing 1·23–1·25 times longer than hindwing, costal margin of hindwing with 0–1 seta proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with a weakly developed basal spine, with one strong outer and three inner apical spurs; basal segment of hind tarsus elongate. Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 250–252; ♀ genital segment (Fig. 253) very short, proctiger with rounded apex, apicodorsal surface of ventral valves of ovipositor weakly serrate.

Measurements (2 ♂, 2 ♀). Maximum width of head, ♂ 0·55–0·57, ♀ 0·59–0·61; length of antennal flagellum, ♂ 0·96, ♀ 1·06; length of ultimate rostral segment, ♂ 0·10–0·11, ♀ 0·11–0·12; length of forewing, ♂ 2·91–3·14, ♀ 3·36–3·47; length of hind tibia, ♂ 0·45–0·48, ♀ 0·47–0·49.

Larva unknown.

Host plant. Possibly *Bartsia longiflora* (Scrophulariaceae).

Holotype ♂, **Kenya**: Mt Elgon, 10,300′, i.1974, on yellow flowers (*S. Collins*) (BMNH; slide mounted).

Paratypes. **Kenya**: 1 ♀, same data as holotype. **Ethiopia**: 1 ♀ (without head), Simien, Lori, 11,500′, beaten from low yellow-flowered bushes, *Bartsia longiflora*; 1 ♂, 3 ♀, 'Abyssinia', Mt Zuquala, *c.* 9,000′, 22.x.1926, beaten from trees near lake shore (*H. Scott*). **Zaire** ('Congo Belge'): 1 ♀ Ruanda, Lac N'Gando ('pied volc. Karisimbi'), 2,400 m, 8.iii.1935 (*G. F. de Witte* 1216); 1 ♂ Terr. Rutshuru, 7.iv.1937 (*Miss. Prophylactique*). (BMNH; MRAC; slide and dry mounted.)

Comments. This species most closely resembles *T. obscura* Tuthill, 1952, and some undescribed species which develop on *Hebe* spp. (Scrophulariaceae) in New Zealand, but this resemblance may be due to characters of the head, thorax and forewing being in the primitive state. Within the African fauna *laingi* is similar to *karroo* (p. 64) but the two species may be separated by the characters given in key couplet 4.

The material from Mt Zuquala, Ethiopia, was deposited in the BMNH under the Laing manuscript name '*Trioza semibrunneipennis*'.

Trioza medleri sp. n.

(Figs 10, 39, 254, ?255)

Description. Adult. Integument densely covered with long setae (Fig. 39). Head, in profile, depressed at 90° to longitudinal axis of body, from above narrower than mesoscutum; occipital margin rounded; vertex deeply divided into two bulbous halves by median suture, eyes very prominent and rounded; median ocellus not visible from above, frons completely covered by genae; genal cones long, conical, with subacute apices; antennal flagellum (Fig. 10) 1·66 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, 1–6 with very long setae, apical flagellomere with one long and one extremely short and truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with several pairs of setae. Thorax, in profile, strongly arched; pronotum, from above, with a rhomboid dorsal disc and strongly narrowing laterally, in profile strongly rounded down behind occiput; mesopraescutum, from above, slightly wider than long, anterior margin broadly arcuate, in profile rounded down to pronotum; forewing (Fig. 254) obovoid, broadly rounded distally, 2·29 times longer than wide, radular areas elongate, cell *c+sc* with a narrow diagonal band of spinules, remainder of membrane devoid of spinules; veins densely clothed with long setae, *R* branch acutangular, *M* branching proximal to $Rs-Cu_{1a}$ line, *Cu* stem 0·39 times as long as Cu_{1b}, m_1 cell value 2·61, cu_1 cell value 0·76; forewing 1·38 times longer than hindwing, costal margin of hindwing with 0–1 seta proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia without basal spines and with one outer and two inner apical spurs. ♂ unknown; ♀ abdomen with setae on tergite 3, genital segment short, conoid, proctiger strongly sclerotised apically, ovipositor valves smooth.

Measurements (1 ♀). Maximum width of head, 0·7; length of antennal flagellum, 1·16; length of ultimate rostral segment, 0·14; length of forewing, 3·85; length of hind tibia, 0·67.

Larva and host plant unknown.

Holotype ♀, **Nigeria**: NE. State, Ngel Nyaki, 31.iii.1970 (*J. T. Medler*) (BMNH; dry mounted).

Paratypes. 2 ♀, same data as holotype (BMNH; slide and dry mounted).

Non-paratypic material. **Zaire** ('Congo Belge'): 1 ♂, PNG, Miss. H. de Seager, II/fe/7, 4.vii.1952, 3729; 1 ♂, PFNK 7/9, 28.vii.1952, 3842 (*H. de Saeger*) (MRAC).

Comments. This is a very distinctive species which may be easily recognised by the structure of the head, pronotum and forewing, the latter resembling those of the Hawaiian genera *Hevaheva* and *Hemischizocranium*. In overall appearance *medleri* is similar to the Indian species *Petaloloyma basalis* (Walker, 1858) but the latter has a less cleft head which is more adpressed to the thorax, the pronotum is completely hidden dorsally, the mesonotum is less arched or produced forward, and the tibial spurs are much more strongly developed.

Apart from the type-series I have examined 2 ♂ from Zaire, deposited in MRAC, which may be conspecific but have a much shorter m_1 cell (value 1·85). The genitalia are shown in Fig. 255.

Trioza schroederi sp. n.

(Figs 256–260)

Description. Adult. Integument sparsely clothed with short setae. Head, in profile, depressed almost to 90° from longitudinal axis of body, from above almost as wide as mesoscutum; occipital margin broadly obtusangular; vertex rounded pentagonal, anteriorly incised by median suture and strongly rounded to genae, secondary diagonal grooves present from median ocellus backwards to lateral concavities, latter weak; median ocellus just visible from above, frons just visible in anterior view; genal cones elongate conoid, with rounded apices, in parallel plane to vertex; antennal flagellum 2·33–2·64 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with two long subequal setae apically; clypeus with a pair (rarely with a second very short pair) of setae, ultimate rostral segment with a pair of setae. Thorax weakly arched; pronotum strongly rounded down behind occiput; mesopraescutum, from above, about as long as wide, with arcuate anterior margin, in profile strongly rounded down to pronotum; forewing (Fig. 256) elongate oval with rounded obtusangular apex, 2·76–2·87 times longer than wide, membrane devoid of spinules apart from a small cloud around base of claval suture and triangular radular areas; veins bearing short setae, *R* branch acutangular, *Rs* long and sinuous, *M* branching proximal to $Rs-Cu_{1a}$ line, *Cu* stem 1·32–1·71 times longer than Cu_{1b}, m_1 cell value 1·47–1·65, cu_1 cell value 1·29–1·68; forewing 1·5 times longer than hindwing, costal margin of hindwing

with up to eight setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with 1–2 small tubercles basally and one outer and two inner apical spurs. Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 257–259; ♀ genital segment (Fig. 260) short, conoid, proctiger with a weak transverse groove immediately posterior to anus, apex of ventral valve of ovipositor with two ventrolateral serrations.

Measurements (4 ♂, 2 ♀). Maximum width of head, ♂ 0·49–0·56, ♀ 0·56–0·57; length of antennal flagellum, ♂ 1·19–1·48, ♀ 1·39; length of ultimate rostral segment, ♂ 0·13–0·16, ♀ 0·14–0·15; length of forewing, ♂ 2·85–3·68, ♀ 3·49; length of hind tibia, ♂ 0·47–0·62, ♀ 0·54–0·56.

Larva and host plant unknown. One adult ♂ paratype was collected on *Myrica conifera* (Myricaceae).

Holotype ♂, **Tanzania**: Kilimanjaro, Bismark Hut, 2,500–3,000 m, S. Mawenzi, at foot of high pasture, ii.1912 (*Chr. Schröder*) (MNHU; slide mounted).

Paratypes. **Tanzania**: 6 ♂, 3 ♀, same data as holotype. **Zaire** ('Congo Belge: Ruanda'): Lac N'Gando, pied Volc. Karisimbi, 2,400 m, 6.iii.1935 (*G. F. de Witte*). **Zimbabwe** ('S. Rhodesia'): 1 ♂, Harare ('Salisbury'), iii.1957, *Myrica conifera* (*N. L. H. Krauss*). (BMNH; MNHU; MRAC; slide mounted and stored in 80% ethanol.)

Non-paratypic material (damaged specimens). **Tanzania**: 1 ♀, 1 ?, 'D. O. Afrika, Kilimandscharo', 3000–4000 m, i.1906; 2 ♀, Amani, xii.1905 (*Chr. Schröder*) (MNHU). **Zaire** ('Congo Belge'): P.N.A., Secteur Tshiaberimu, riv. Kalivina affl1., Talia Nord, 2,350 m, 29.iii.1954 (*P. Vanschuytbroek & H. Synave*) (MRAC).

Comments. This species shows no clear relationships to other Afrotropical species, having several features of the wing in the primitive state. It is superficially similar to *theroni* (p. 67), from which it differs in having long, well-developed genal cones and lacking supplementary rhinaria on the first flagellomere.

Trioza tangae sp. n.

(Figs 18, 261–264)

Description. Adult. Integument covered with long setae. Head, in profile, depressed almost at 90° to longitudinal axis of body; occipital margin obtusangular; vertex pentagonal, rounded down to genae, median suture weak but complete, lateral concavities well developed; median ocellus just visible from above, frons completely covered by genal cones; latter well developed, conoid, with rounded apices; antennal flagellum 1·76–1·83 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere twice as long as 7th (Fig. 18) and bearing one long and one short and truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with three pairs of setae. Thorax weakly arched; pronotum strongly rounded down behind occiput; mesopraescutum, from above, about as long as wide, with a moderately arcuate anterior margin, in profile gently rounded down to pronotum; forewing (Fig. 261) elongate elipsoid, narrowing distally to rounded obtusangular apex, 2·62–2·79 times longer than wide, membrane devoid of spinules apart from narrow radular areas and a small patch at base of claval suture; veins bearing moderately long setae at least in proximal half of wing, *R* branch acutangular, *M* branching distal to $Rs-Cu_{1a}$, *Cu* stem 2·26–2·81 times longer than Cu_{1b}, m_1 cell value 1·08–1·38, cu_1 cell value 1·83–2·32; forewing 1·47–1·51 times longer than hindwing, costal margin of hindwing with 0–1 seta proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with 3–4 small tubercles basally, with one outer and two inner apical spurs. Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 262–264; ♀ genital segment short, conoid, ventral valves of ovipositor arrowhead-like apically and finely serrate.

Measurements (2 ♂, 2 ♀). Maximum width of head, ♂ 0·41–0·47, ♀ 0·41–0·43; length of antennal flagellum, ♂ 0·75, ♀ 0·72–0·76; length of ultimate rostral segment, ♂ 0·08–0·10, ♀ 0·07–0·08; length of forewing, ♂ 2·30–2·61, ♀ 2·20–2·49; length of hind tibia, ♂ 0·48–0·52, ♀ 0·45–0·50.

Larva and host plant unknown.

Holotype ♂, **Tanzania**: E. Usambara Mtns, Amani Res. sta., *c.* 3,000′, 19–27.vi.1974, yellow tray (*D. Hollis*) (BMNH; slide mounted).

Paratypes. **Tanzania**: 2 ♀, same data as holotype; 1 ♂, light-trap (*D. Hollis*); 1 ♂, Kilimanjaro, Bismark Hut, 2,500–3,000 m, S. Mawenzi, at foot of high pasture, ii.1912 (*Chr. Schröder*). (BMNH; MNHU; slide and dry mounted.)

COMMENT. This species is distinguished by its relatively long apical flagellomere and male genitalia, the latter resembling those of the *nigricornis*-group (sensu Hodkinson, 1981) in the Palaearctic Region.

Trioza tenuis sp. n.

(Figs 36, 37, 43, 265–267)

DESCRIPTION. Adult. Integument very sparsely covered with very short setae. Head, in profile (Fig. 37), at 90° to longitudinal axis of body, from above (Fig. 36) almost as wide as mesoscutum; occipital margin sharp dorsomedially and strongly indented by median suture of vertex; vertex also deeply cleft by median suture, lateral concavities weak; median ocellus just visible in dorsal view, frons visible between genae in anterior view; genal cones very poorly developed, rounded; antennal flagellum 1·51–1·63 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with a long pointed seta and a short truncate seta apically; clypeus with a pair of setae, ultimate rostral segment long and densely setose. Thorax (Figs 36, 37) moderately arched; from above the pronotum is more clearly visible at its lateral margins, the mesopraescutum being strongly produced forward medially, in profile pronotum strongly rounded down behind occiput and mesopraescutum angled down to pronotum; forewing (Fig. 265) elongate oval, strongly narrowing to acutangular apex, 3·08–3·19 times longer than wide, radular areas elongate triangular, remainder of membrane devoid of spinules; veins bearing short setae, *R* branch acutangular, *M* branching proximal to $Rs-Cu_{1a}$ line, *Cu* stem 0·28–0·35 times as long as Cu_{1b}, m_1 cell value 2·33–2·55, cu_1 cell value 1·01–1·08; forewing 1·71–1·75 times longer than hindwing, costal margin of hindwing with up to four setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and an extremely well-developed anterior lobe; hind tibia with a well-developed basal spine and one outer and three (rarely two on one tibia only) inner spurs apically. Abdomen with setae on tergites 2 and 3 in ♂ and 3 and 4 in ♀; ♂ proctiger weakly expanded laterally, paramere and aedeagus as in Figs 266, 267; ♀ genital segment short, conical, subgenital plate with truncate apex, ovipositor valves smooth.

Measurements (2 ♂, 2 ♀). Maximum width of head, ♂ and ♀ 0·67–0·70; length of antennal flagellum, ♂ 1·09, ♀ 1·04–1·06; length of ultimate rostral segment, ♂ 0·19–0·20, ♀ 0·20; length of forewing, ♂ 4·4, ♀ 4·66–4·74; length of hind tibia, ♂ 0·64–0·66, ♀ 0·65–0·66.

Larva unknown.

HOST PLANT. Few adults collected from *Haplocoelum foliolosum* (Sapindaceae).

Holotype ♂, **Angola**: Bruco, 28.ii.–2.iii.1972, *Haplocoelum foliolosum* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. **Angola**: 5 ♂, 2 ♀, same data as holotype; 1 ♀, swept in riverine forest area, 26–29.ii.1972; 1 ♂, Roçadas, 30.iii.1972 (*D. Hollis*). (BMNH; slide and dry mounted and stored in 80% ethanol.)

COMMENTS. This species shares many primitive character states with *ghanaensis* (p. 62) but has a more slender build, the forewing is narrower and the hind tibia has three inner apical spurs.

Trioza theroni sp. n.

(Figs 24, 268–271)

DESCRIPTION. Adult. Integument sparsely covered with short setae. Head, in profile, at almost 90° to longitudinal axis of body, from above as wide as mesoscutum; occipital margin rounded; vertex pentagonal, with a well-developed irregular concavity on either side of a shallow median suture, frontal lobes weakly developed; median ocellus just visible from above, frons just visible between genae in anterior view; genae slightly swollen and genal cones poorly developed; antennal flagellum 2·60–3·23 times longer than head width, 1st flagellomere (Fig. 24) with an apical group of 1–3 rhinaria and often with an extra rhinarium two-thirds along its length, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with one long and one short and truncate seta apically; clypeus with several short setae, ultimate rostral segment with two pairs of setae. Thorax weakly arched; pronotum clearly visible from above but its anterior margin strongly rounded down behind occiput; mesopraescutum, from above, almost as long as wide, its anterior margin strongly arcuate and angled down to pronotum; forewing (Fig. 268) elongate oval with narrowly rounded apex, 2·61–3·06 times longer than wide, radular areas narrow triangular, remainder of membrane devoid of spinules except for cell cu_2; veins bearing short setae, *R* branch acutangular, *M* branching proximal to $Rs-Cu_{1a}$ line, *Cu* stem 0·80–1·12 times as long as Cu_{1b}, m_1

cell value 1·79–2·30, cu_1 cell value 0·78–0·97; forewing 1·45–1·54 times longer than hindwing, costal margin of hindwing with 1–2 setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia with 1–3 basal spines and one outer and two inner apical spurs. Abdomen with setae on tergite 3 in ♂ and 4 in ♀; ♂ proctiger, paramere and aedeagus as in Figs 269–271; ♀ genital segment short, conical, proctiger with a shallow transverse groove distal to anus, ventral valve of ovipositor with two small teeth on apicoventral surface.

Measurements (7 ♂, 7 ♀). Maximum width of head, ♂ 0·42–0·59; ♀ 0·51–0·60; length of antennal flagellum, ♂ 1·20–1·85, ♀ 1·41–1·71; length of ultimate rostral segment, ♂ 0·12–0·16, ♀ 0·14–0·17; length of forewing, ♂ 2·38–3·64, ♀ 3·00–3·96; length of hind tibia, ♂ 0·39–0·53, ♀ 0·45–0·55.

Larva and host plant unknown.

Holotype ♂, **South Africa**: Cape Town, Milnerton, ii.1926 (*R. E. Turner*) (BMNH; dry mounted).

Paratypes. **South Africa**: 1 ♂, 1 ♀, same data as holotype; 6 ♀, 14–28.xii.1925 (*R. E. Turner*); 1 ♀, Cape Province, Ceres, 13.xii.1969, swept; 2 ♂, 3 ♀, 24.x.1970; 3 ♂, 3 ♀, Rawsonville, 7.xi.1970; 2 ♂, 2 ♀, 1.i.1971; 1 ♂, 2 ♀, Stellenbosch, 3.xii.1970; 1 ♀, 4.i.1971; 1 ♂, Knysna, 15.i.1972 (*J. G. Theron*); 2 ♂, Natal, Kloof, viii.1926 (*R. E. Turner*). (BMNH; NCI; slide and dry mounted and stored in 80% ethanol.)

Comments. The arrangement of supplementary rhinaria on the first flagellomere in *theroni* is distinctive, but the species shows no apparent relationships to other triozids which have developed supplementary rhinaria. *T. schroederi* (p. 65) is superficially similar to *theroni* but has well-developed genal cones and a primitive arrangement of rhinaria.

Trioza tundavalae sp. n.

(Figs 272–274, 323, 324)

Description. Adult. Integument densely covered with long setae. Head, in profile, slightly depressed from longitudinal axis of body, from above narrower than mesoscutum; occipital margin obtusangular; vertex quadrate, its anterior margin rounded downwards and deeply incised by median suture, lateral concavities shallow but clearly defined; median ocellus visible from above, frons visible in anterior view; genal cones short, broadly rounded, in profile depressed from plane of vertex; antennal flagellum 2·2 times longer than head width, a single rhinarium present subapically on flagellomeres 2, 4, 6 and 7, apical flagellomere with a long pointed seta and a short truncate seta apically; clypeus with a pair of setae, ultimate rostral segment with four pairs of setae. Thorax strongly arched; pronotum clearly visible from above, in profile rounded down to occiput; mesopraescutum, from above, slightly wider than long, anterior margin broadly arcuate; forewing (Fig. 272) ovoid with rounded apex, 2·33 times longer than wide, radular areas triangular, remainder of membrane devoid of spinules, course of R and R_1 brown pigmented; veins bearing long setae in proximal third of wing, R branch acutangular, R_1 about 1·5 times longer than R stem, M branching proximal to $Rs-Cu_{1a}$ line, Cu stem 0·88–1·11 times as long as Cu_{1b}, m_1 cell value 1·44–1·48, cu_1 cell value 1·29–1·34; forewing 1·72–1·76 times longer than hindwing, costal margin of hindwing with up to 11 setae proximal to costal break, setae distal to costal break clearly divided into two groups; hind coxa with a well-developed meracanthus and without anterior lobe; hind tibia without basal spine and with one outer and 2–3 inner apical spurs. ♂ unknown; ♀ abdomen with setae on tergites 3 and 4; ♀ genital segment (Fig. 273) short; proctiger (Fig. 274) short, rounded, emarginate posteriorly, anal pore ring of wax-producing cells incomplete anteriorly and forming multiple rows posteriorly; subgenital plate very short, with truncate posterior margin; ventral valve of ovipositor triangularly expanded apically and this expansion with 15–16 saw-like teeth on ventrolateral surface, dorsal surface with serrations.

Measurements (2 ♀). Maximum width of head, 0·83; length of antennal flagellum, 1·84; length of ultimate rostral segment, 0·17; length of forewing, 6·13–6·25; length of hind tibia, 0·95–0·99.

Fifth instar larva (Figs 323, 324). Dorsal surface outline very broadly oval with indentations on either side at base of abdomen and a weak indentation medially on the posterior margin, about 1·2 times longer than wide. Antenna with six flagellomeres. Cephaloprothorax separate from rest of thorax which has mesothorax and metathorax almost completely divided. Forewing pad about 2·1 mm long, humeral lobe extending forward to anterior margin of eye which is close to anterior margin of cephaloprothorax. Caudal plate 0·6 times as long as wide, anus ventral and close to posterior margin of abdomen, anal pore area as in Fig. 324. Narrow, elongate, truncate, tubular sectasetae, with roundly swollen bases, forming an even dense marginal fringe; lanceolate postocular sectaseta present, sectasetae absent from dorsum.

HOST PLANT. Larvae collected in midrib galls on upper surfaces of leaves of *Syzygium benguellense* (Myrtaceae); adults emerged from these galls.

Holotype ♀, **Angola**: Tundavala, 8–10 mls NW. Sa da Bandeira, 27–29.iii.1972, emerged from leaf gall of *Syzygium benguellense* (*D. Hollis*) (BMNH; dry mounted).

Paratypes. 3 ♀, larvae, same data as holotype (BMNH; slide and dry mounted).

COMMENT. This large, robust, pilose species has the distinctive feature that R_1 is considerably longer than R stem, giving r_1 a very broad proximal area. It has a similar general appearance to *Trioza palaquii* (Laing, 1930), described from specimens reared from galls of *Palaquium gutta* (Sapotaceae) from Malaya, but this may be convergence as both species live in enclosed galls.

Doubtful species

Trioza bussei Zacher, 1915

Trioza bussei Zacher, 1915: 526; 1916: 419. Syntypes, larvae and adults, CAMEROUN: Soppo, on *Kickxia* (not traced).

The first published indication of this species was a brief description of the larva and a figure of the adult wing. Zacher (1916) gives a further description of the egg, all larval stages and the adult female. No diagnostic features are mentioned. The type-series was not traced and no reply was received to enquiries at the Institut für Pflanzenschutzforschung, Eberswalde.

Trioza similis Heslop-Harrison, 1961

Trioza similis Heslop-Harrison, 1961: 530. Holotype ♀, SOUTH AFRICA: 'Cape Prov., Tzitzikama Forest, Stormsrivierpiek, 13.i.1951, Loc. no. 137. In indigenous forest' (lost).

The original description and fig. 12 (I) mentions an anteriorly projecting epiphysis on the ventral surface of the subgenital plate, but this is not shown in fig. 12 (H). No other diagnostic features are mentioned.

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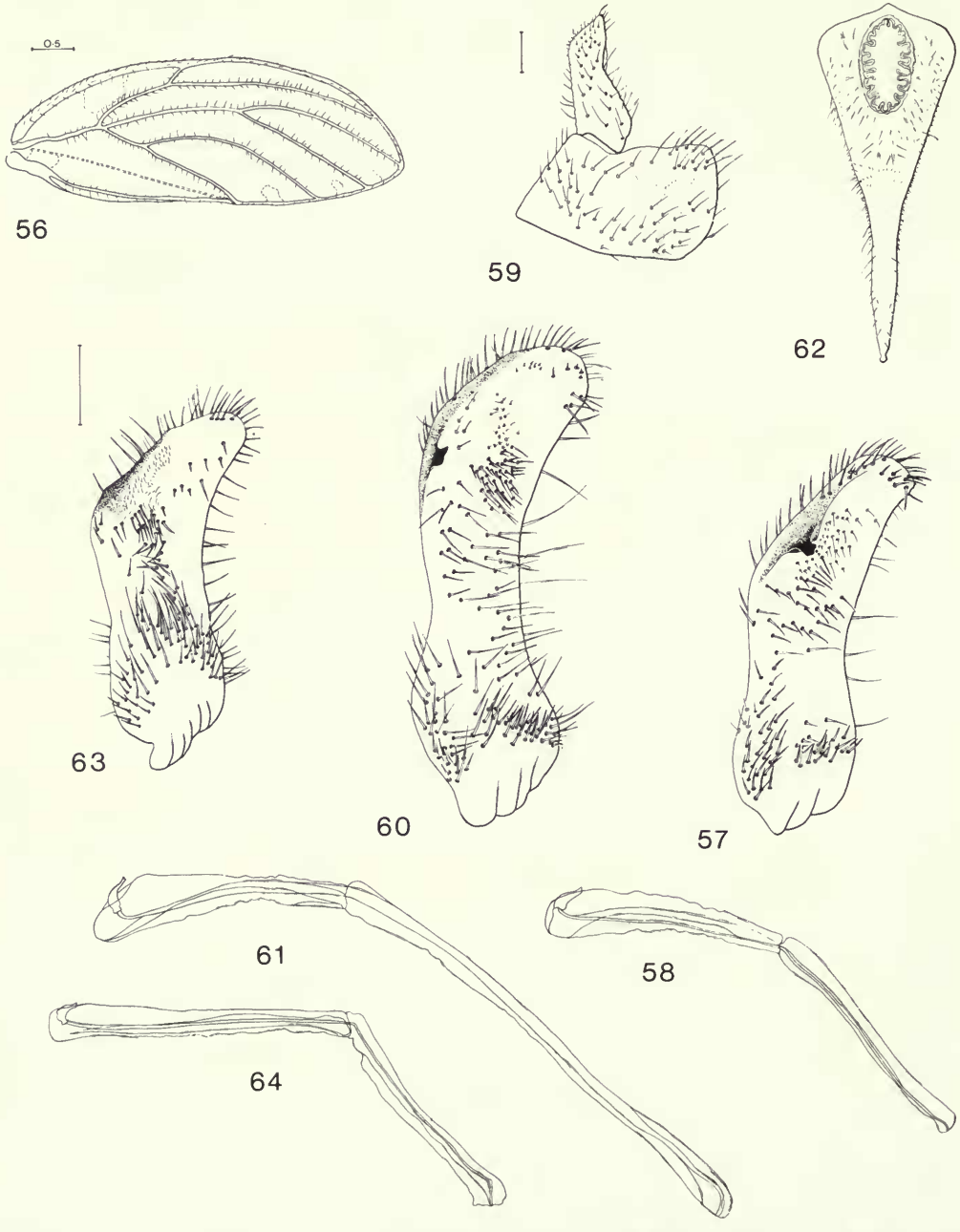
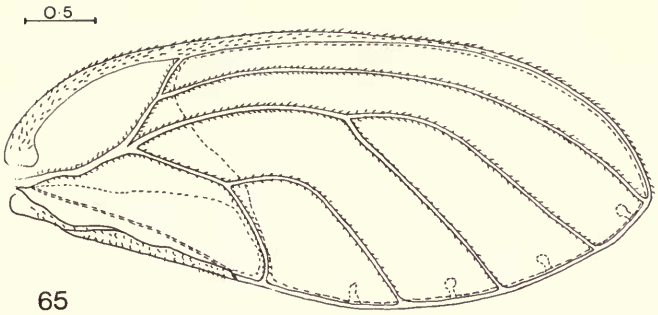


Figs 56–64 *Triozamia* species. 56–58, *T. usambarensis*; 56, forewing; 57, paramere; 58, apical segments of aedeagus. 59–62, *T. vondraceki*; 59, ♂ proctiger, lateral view; 60, paramere; 61, apical segments of aedeagus; 62, ♀ proctiger, dorsal view. 63, 64, *T. lamborni*, 63, paramere; 64, apical segments of aedeagus.



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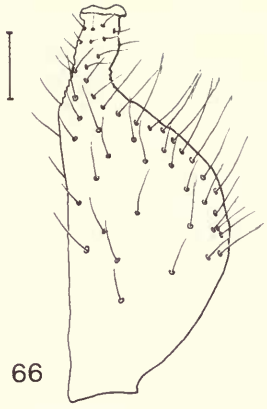

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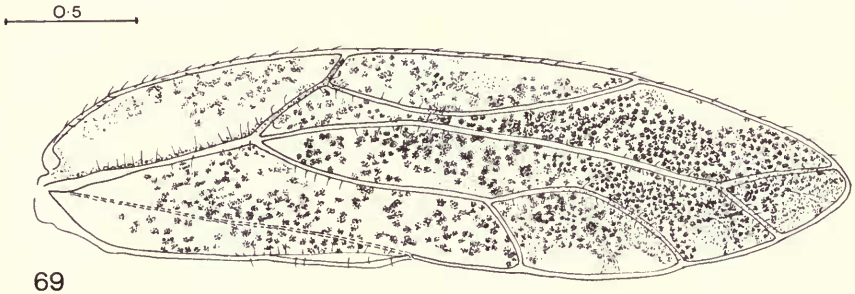

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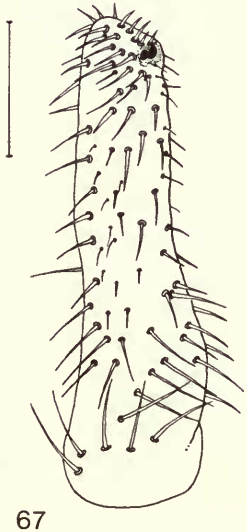

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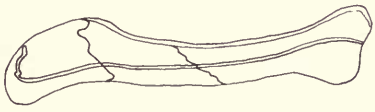

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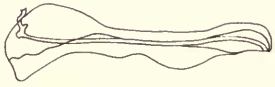

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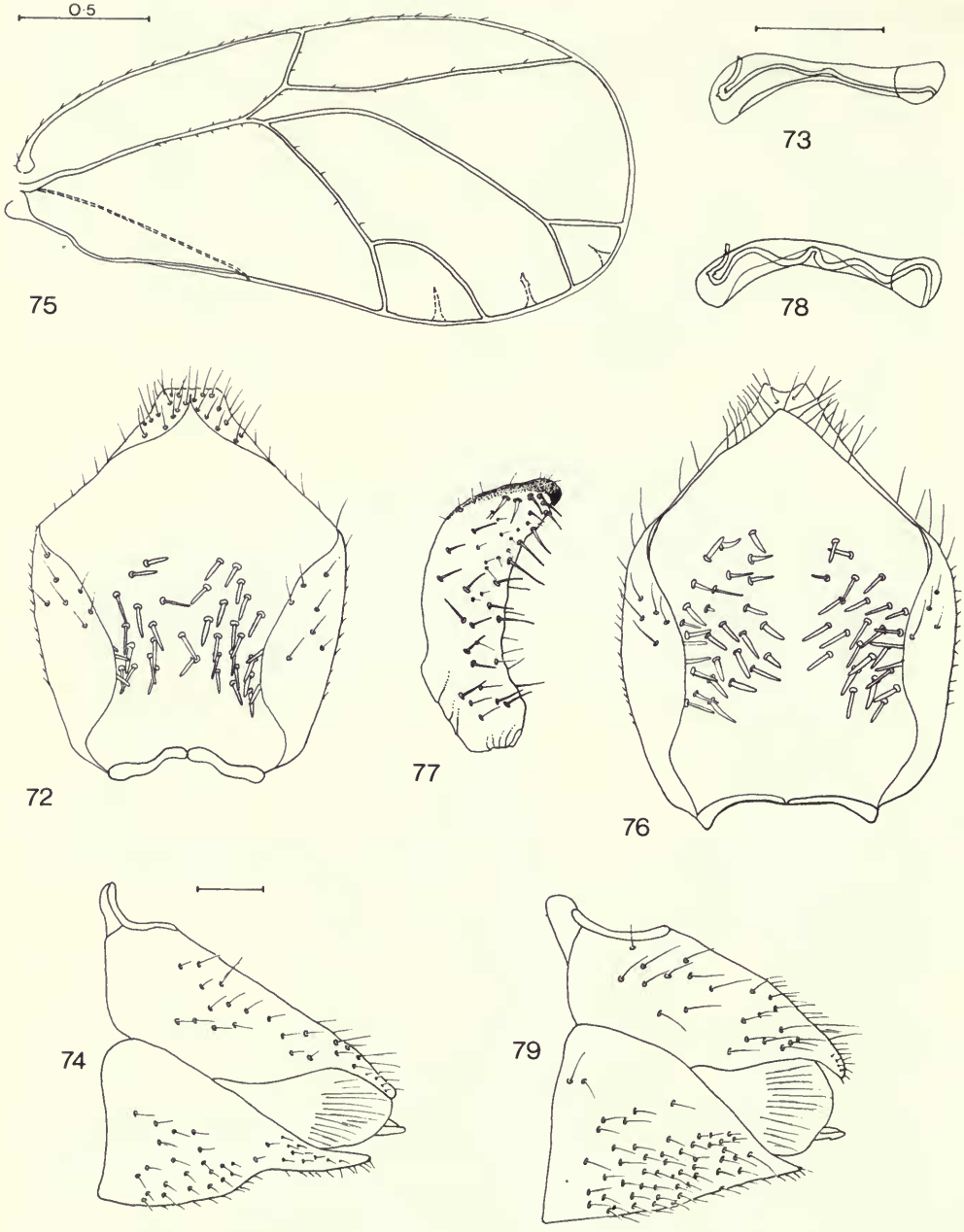
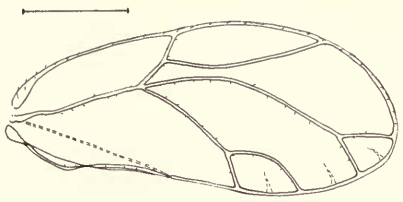
Figs 65–71 Afrotropical Triozidae. 65–68, *Afrotrioza bersama*; 65, forewing; 66, ♂ proctiger, lateral view; 67, paramere; 68, apical segment of aedeagus. 69–71, *Trichochermes insleyi*; 69, forewing; 70, paramere; 71, apical segment of aedeagus.



Figs 72–79 *Pauropsylla willcocksi*-group. 72–74, *P. willcocksi*; 72, ♂ proctiger, posterior view; 73, apical segment of aedeagus; 74, ♀ genital segment, lateral view. 75–78, *P. trichaeta*; 75, forewing; 76, ♂ proctiger, posterior view; 77, paramere; 78, apical segment of aedeagus. 79, *P. tatrichea*, ♀ genital segment, lateral view.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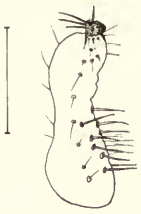
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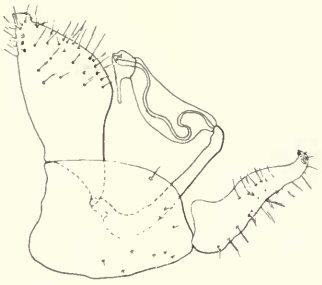
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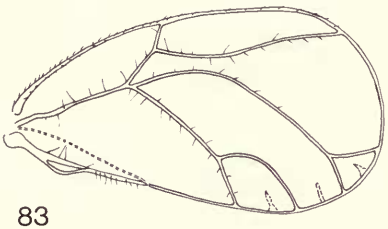
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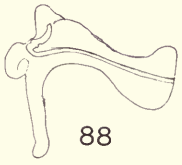
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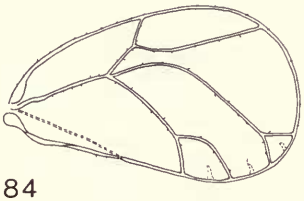
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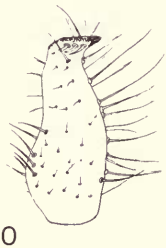
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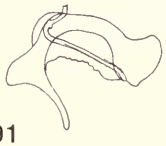
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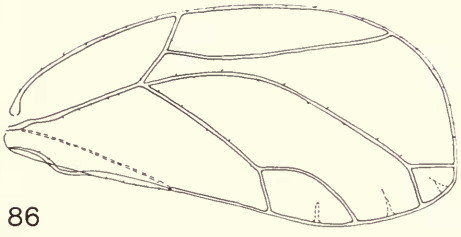
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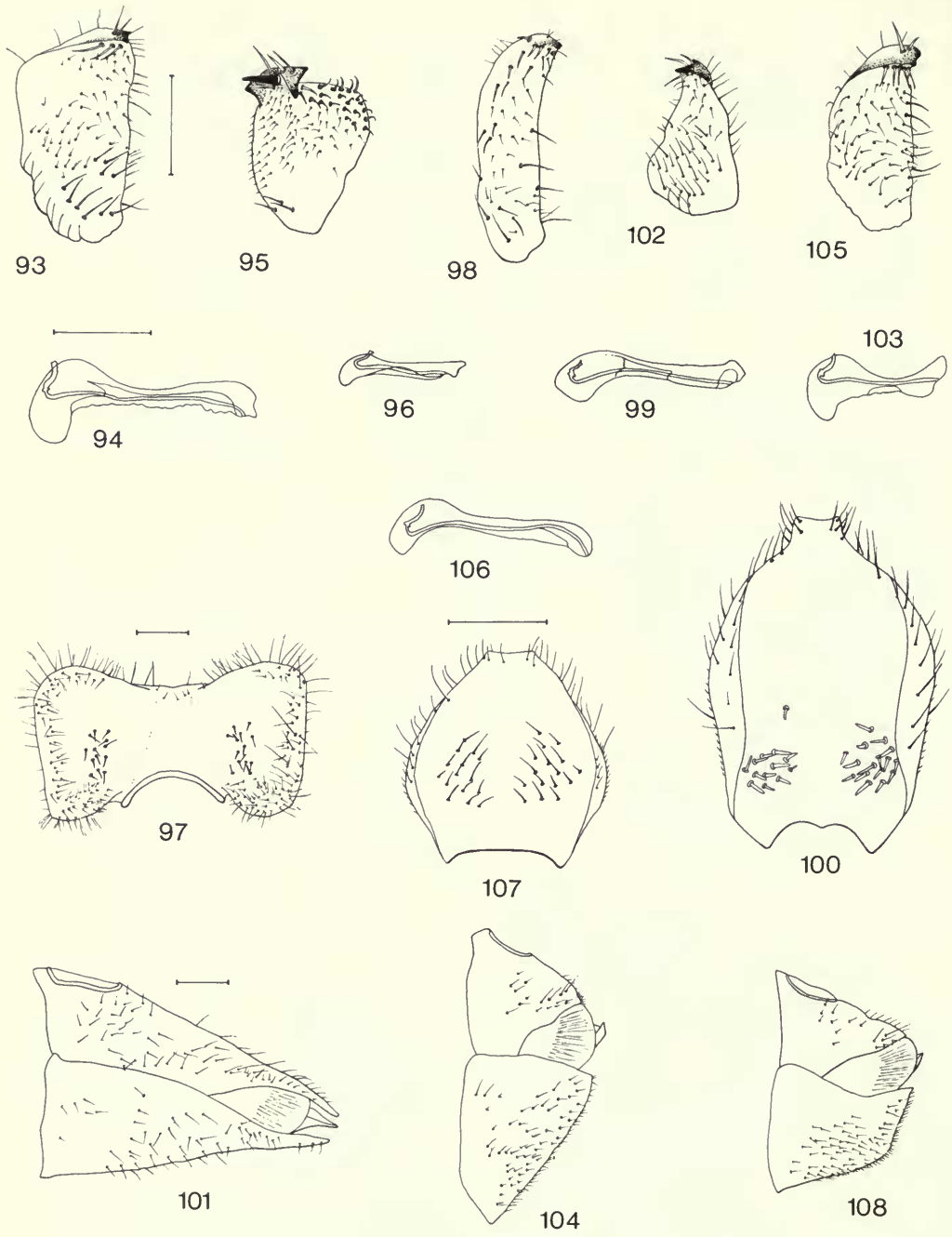
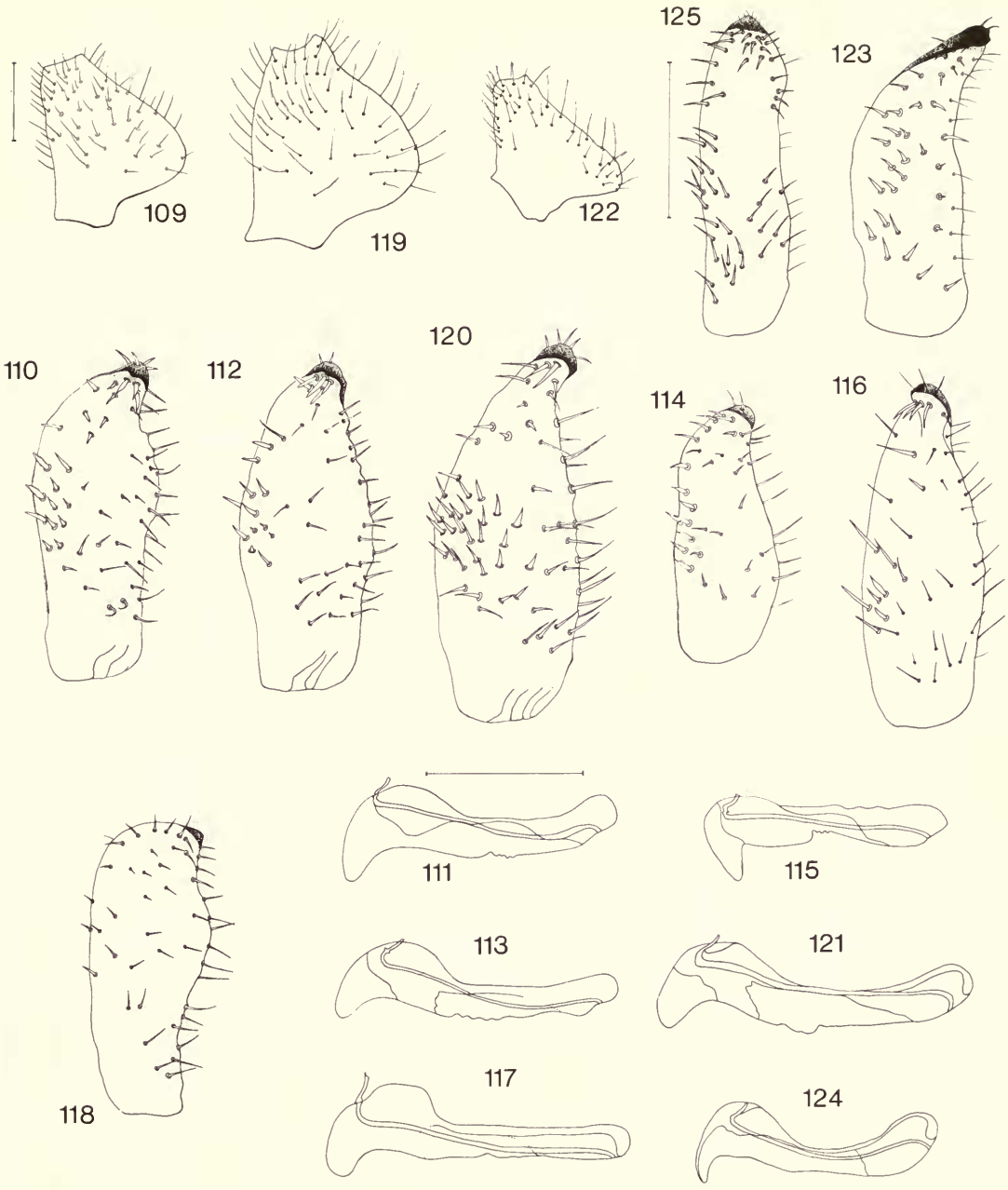
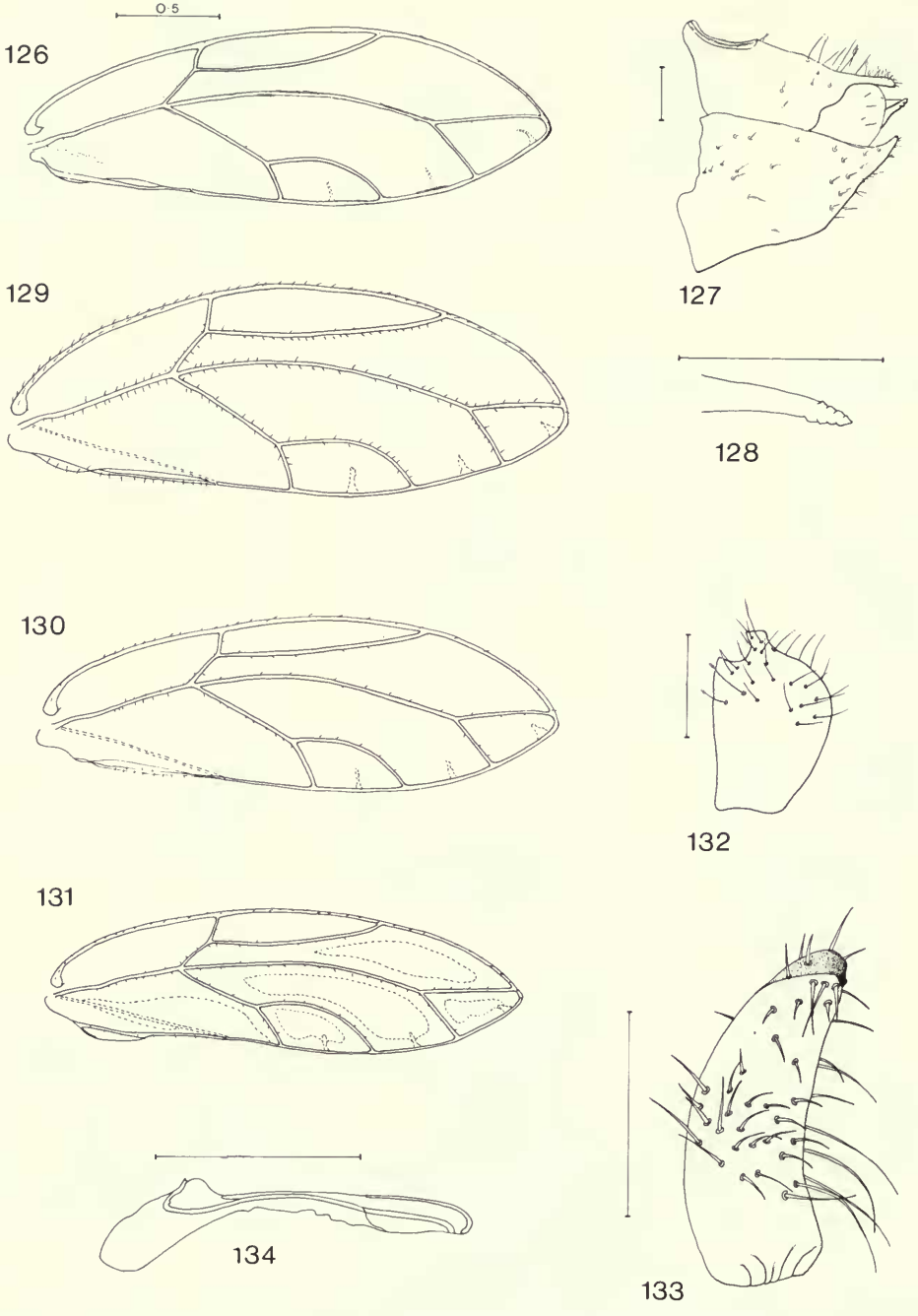
Figs 80–92 *Pauropsylla* species. 80–82, *P. trigemma*; 80, forewing; 81, paramere; 82, apical segment of aedeagus. 83, *P. ngongae*, forewing. 84, 85, *P. breviantennata*, 84, forewing; 85, ♂ genitalia, lateral view. 86–89, *P. septima*; 86, forewing; 87, paramere; 88, apical segment of aedeagus; 89, median posterior margin of ♀ subgenital plate, ventral view. 90–92, *P. proxima*; 90, paramere; 91, apical segment of aedeagus; 92, median posterior margin of ♀ subgenital plate, ventral view.



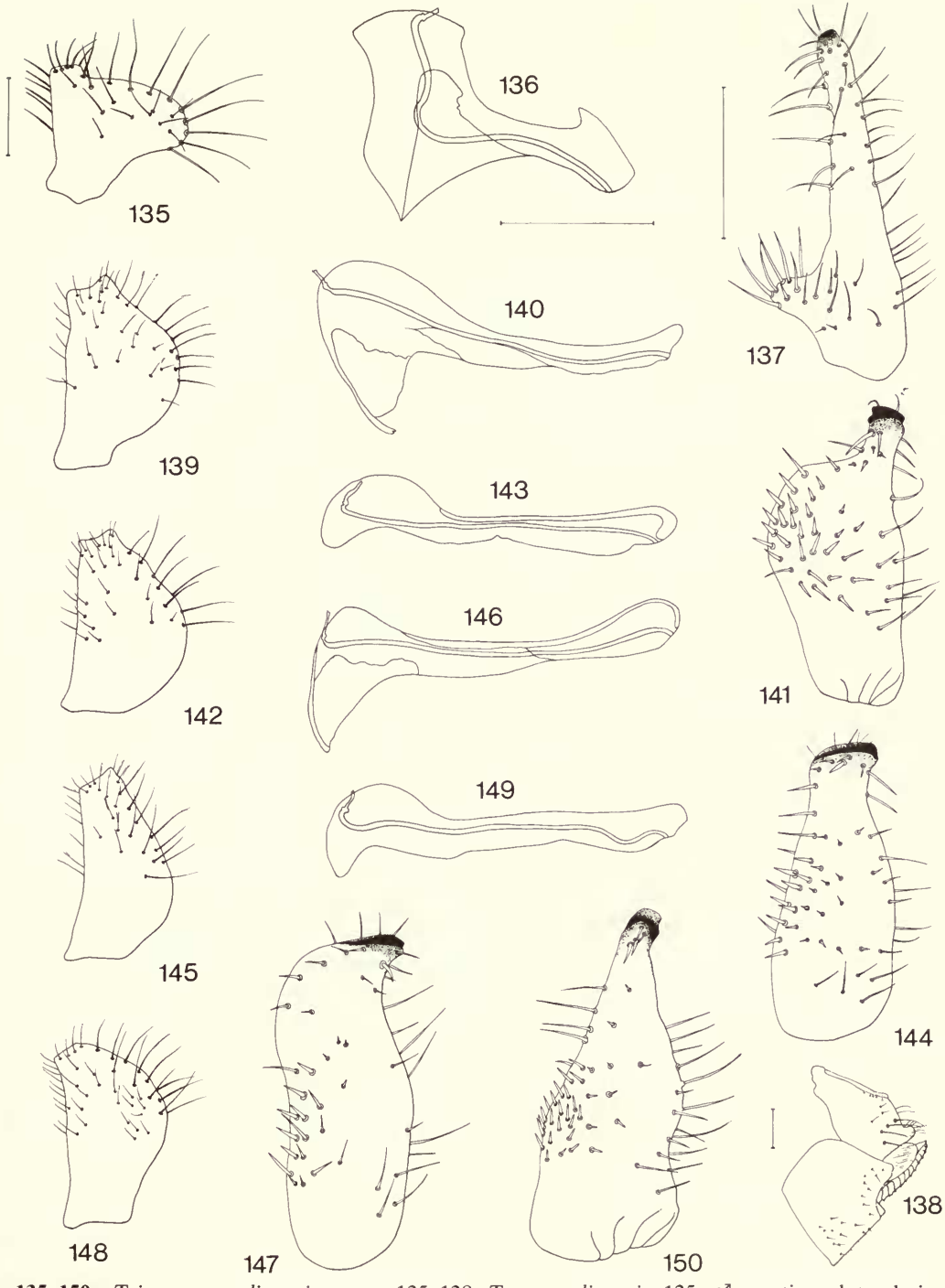
Figs 93–108 *Pauropsylla* species. 93, 94, *P. angolensis*; 93, paramere; 94, apical segment of aedeagus. 95–97, *P. eastopi*; 95, paramere; 96, apical segment of aedeagus; 97, ♂ proctiger, posterior view. 98–101, *P. longipes*; 98, paramere; 99, apical segment of aedeagus; 100, ♂ proctiger, posterior view; 101, ♀ genital segment, lateral view. 102–104, *P. mistura*; 102, paramere; 103, apical segment of aedeagus; 104, ♀ genital segment, lateral view. 105–108, *P. senegalensis*, 105, paramere; 106, apical segment of aedeagus; 107, ♂ proctiger, posterior view; 108, ♀ genital segment, lateral view.



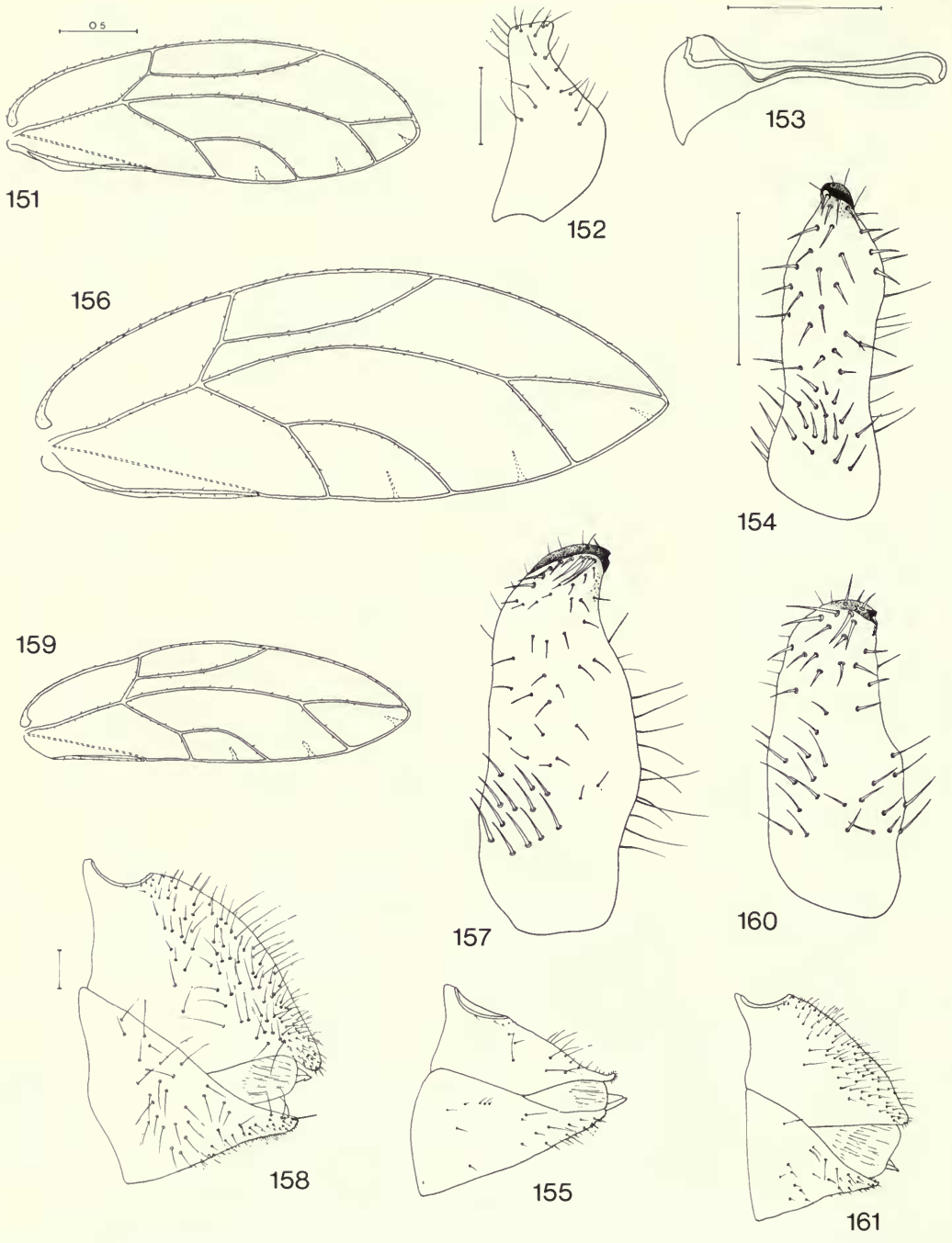
Figs 109–125 *Trioza erytreae*-group, ♂ genitalia. 109–111, *T. erytreae*; 109, proctiger, lateral view; 110, paramere; 111, apical segment of aedeagus. 112, 113, *T. catlingi*; 112, paramere; 113, apical segment of aedeagus. 114, 115, *T. gregoryi*; 114, paramere; 115, apical segment of aedeagus. 116, 117, *T. ata*; 116, paramere; 117, apical segment of aedeagus. 118, *T. kilimanjarica*, paramere. 119–121, *T. tiliacora*; 119, proctiger, lateral view; 120, paramere; 121, apical segment of aedeagus. 122–124, *T. carvalhoi*; 122, proctiger, lateral view; 123, paramere; 124, apical segment of aedeagus. 125, *T. eafra*, paramere.



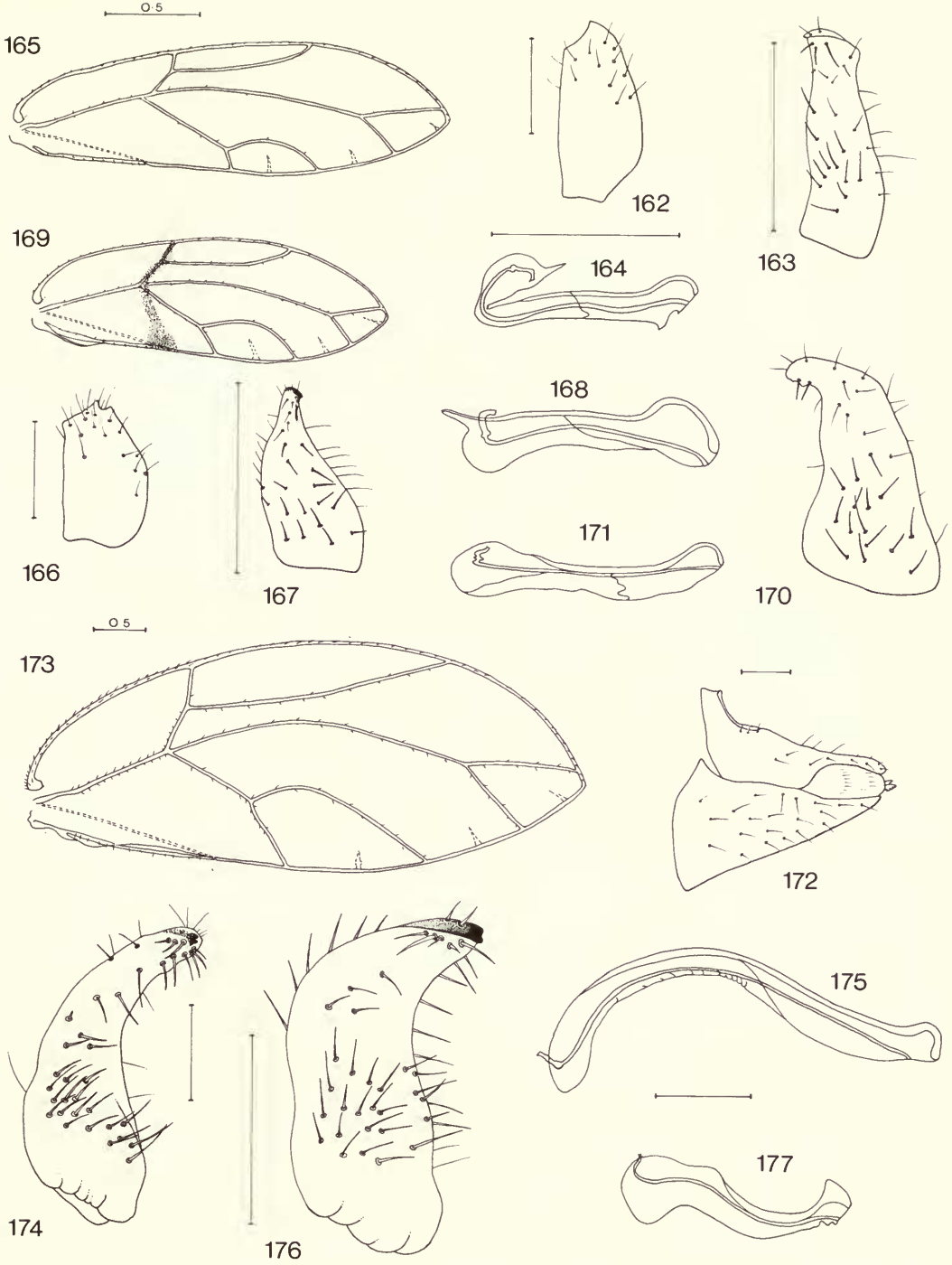
Figs 126–134 *Trioza erytreae* and *litseae*-groups. 126, 127, *T. erytreae*; 126, forewing; 127, ♀ genital segment, lateral view. 128, *T. ata*, apex of lower valve of ovipositor. 129, *T. tiliacora*, forewing. 130, *T. carvalhoi*, forewing. 131–134, *T. xylopia*; 131, forewing; 132, ♂ proctiger, lateral view; 133, paramere; 134, apical segment of aedeagus.



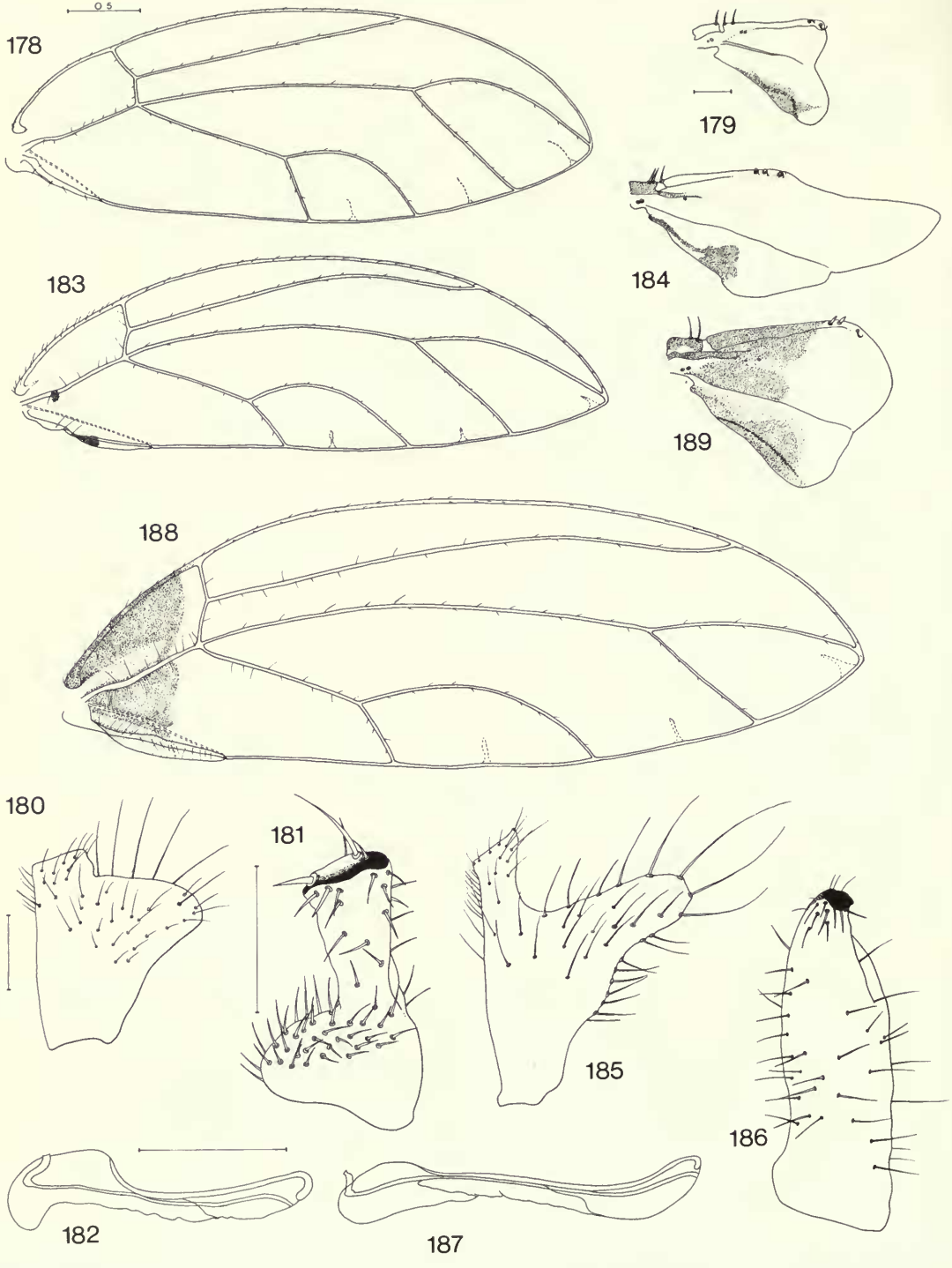
Figs 135–150 *Trioza anomalicornis*-group. 135–138, *T. anomalicornis*; 135, ♂ proctiger, lateral view; 136, apical segment of aedeagus; 137, paramere; 138, ♀ genital segment, lateral view. 139–141, *T. kakamegae*; 139, ♂ proctiger, lateral view; 140, apical segment of aedeagus; 141, paramere. 142–144, *T. thibae*; 142, ♂ proctiger, lateral view; 143, apical segment of aedeagus; 144, paramere. 145–147, *T. tavandula*; 145, ♂ proctiger, lateral view; 146, apical segment of aedeagus; 147, paramere. 148–150, *T. luvandata*; 148, ♂ proctiger, lateral view; 149, apical segment of aedeagus; 150, paramere.



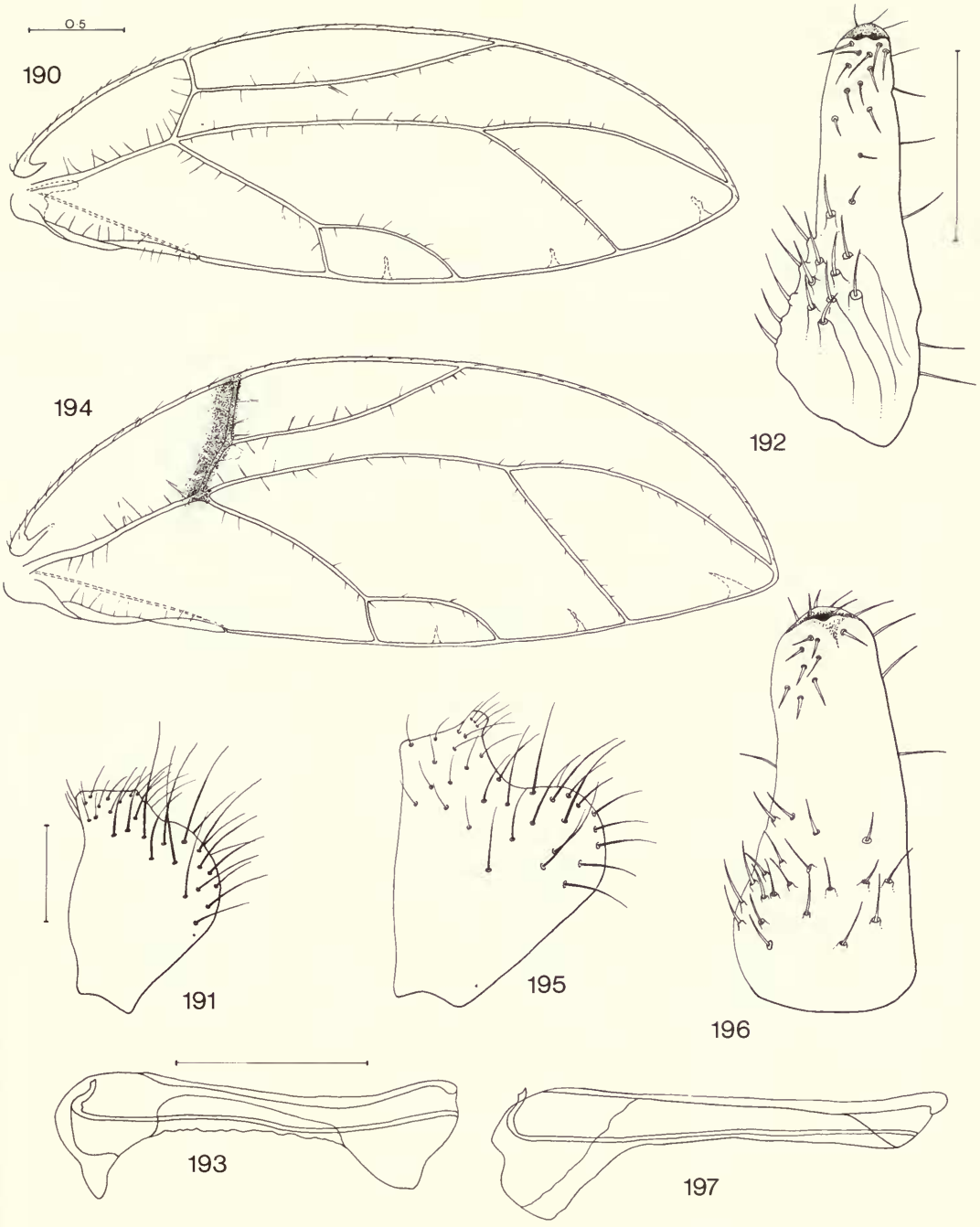
Figs 151–161 *Trioza neoboutonia*-group. 151–155, *T. neoboutonia*; 151, forewing; 152, ♂ proctiger, lateral view; 153, apical segment of aedeagus; 154, paramere; 155, ♀ genital segment, lateral view. 156–158, *T. harteni*; 156, forewing; 157, paramere; 158, ♀ genital segment, lateral view. 159–161, *T. chiangae*; 159, forewing; 160, paramere; 161, ♀ genital segment, lateral view.



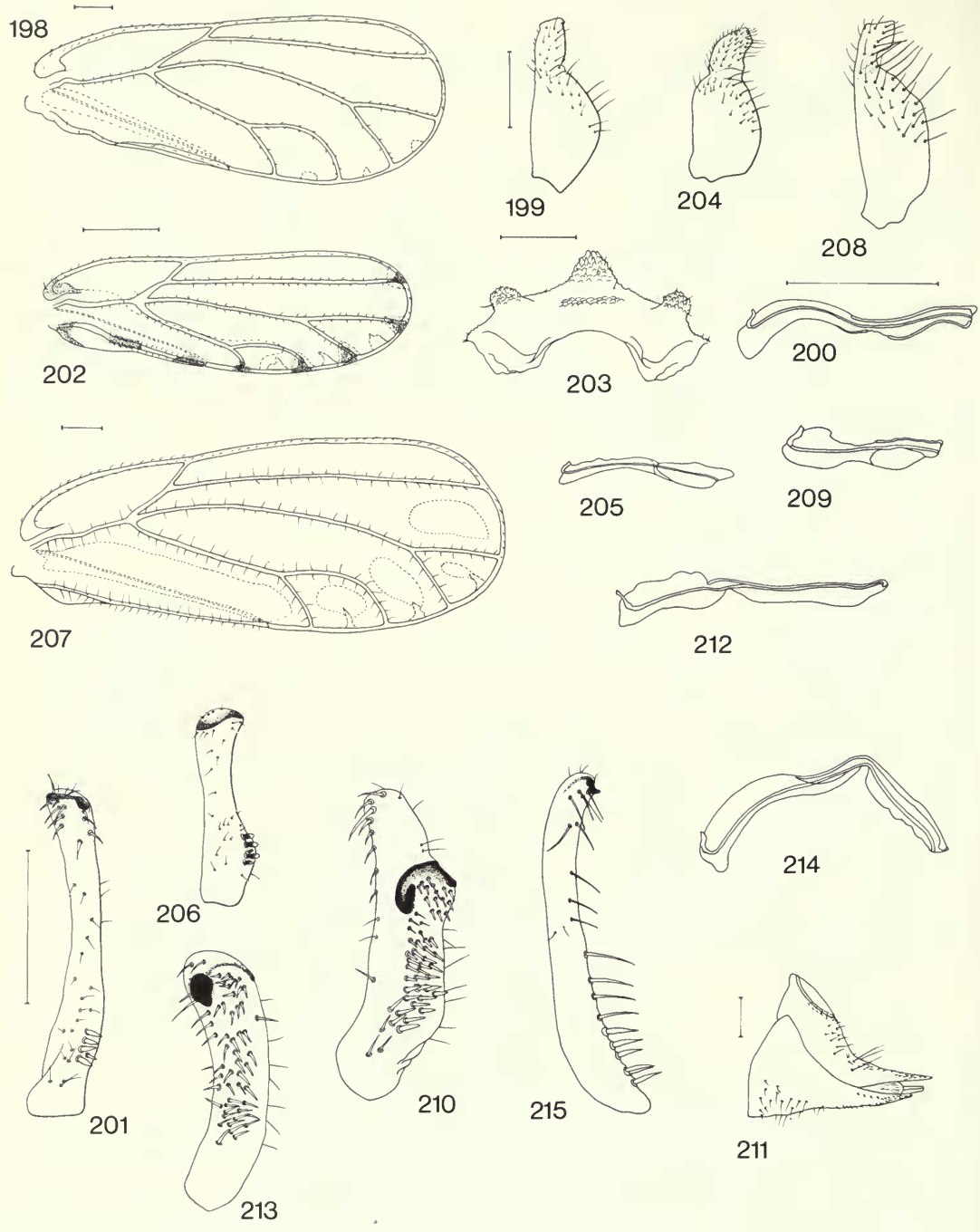
Figs 162–177 *Trioza neoboutonia* and *hargreavesi*-groups. 162–164, *T. bamendae*; 162, ♂ proctiger, lateral view; 163, paramere; 164, apical segment of aedeagus. 165–168, *T. dinaba*; 165, forewing; 166, ♂ proctiger, lateral view; 167, paramere; 168, apical segment of aedeagus. 169–172, *T. nachingweae*; 169, forewing; 170, paramere; 171, apical segment of aedeagus; 172, ♀ genital segment, lateral view. 173–175, *T. hargreavesi*; 173, forewing; 174, paramere; 175, apical segment of aedeagus. 176, 177, *T. mirificornis*; 176, paramere; 177, apical segment of aedeagus.



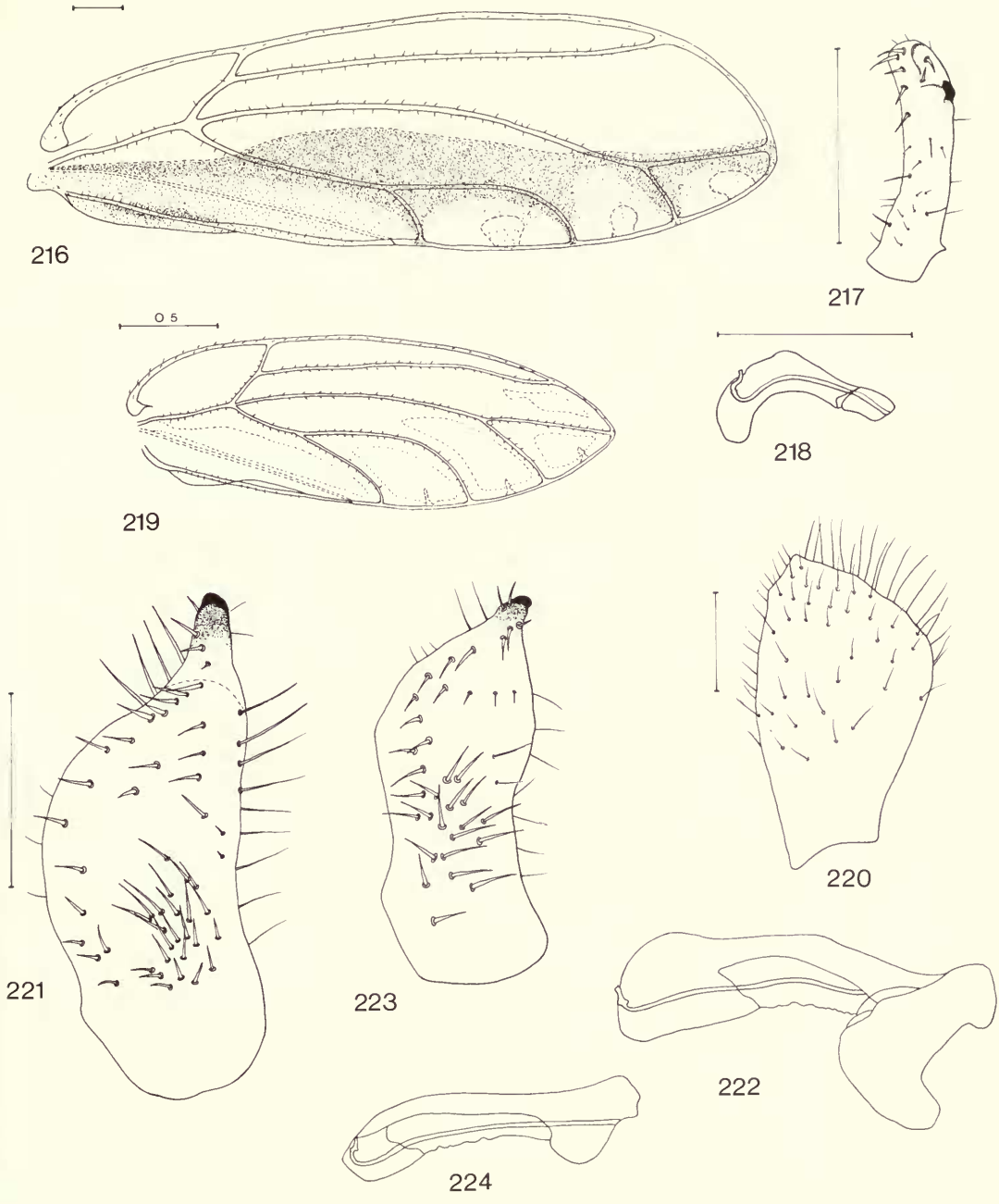
Figs 178–189 *Trioza obsoleta*-group. 178–182, *T. afrobsoleta*; 178, forewing; 179, hindwing; 180, ♂ proctiger, lateral view; 181, paramere; 182, apical segment of aedeagus. 183–187, *T. gonjae*; 183, forewing; 184, hindwing; 185, ♂ proctiger, lateral view; 186, paramere; 187, apical segment of aedeagus. 188, 189, *T. boxi*; 188, forewing; 189, hindwing.



Figs 190–197 *Trioza obsoleta*-group. 190–193, *T. afrosersalisia*; 190, forewing; 191, ♂ proctiger, lateral view; 192, paramere; 193, apical segment of aedeagus. 194–197, *T. mimusops*; 194, forewing; 195, ♂ proctiger, lateral view; 196, paramere; 197, apical segment of aedeagus.



Figs 198–215 *Trioza etiennei*-group. 198–201, *T. etiennei*; 198, forewing; 199, ♂ proctiger, lateral view; 200, apical segment of aedeagus; 201, paramere. 202–206, *T. messaratina*; 202, forewing; 203, pronotum, anterodorsal view; 204, ♂ proctiger, lateral view; 205, apical segment of aedeagus; 206, paramere. 207–211. *T. seranistama*; 207, forewing; 208, ♂ proctiger, lateral view; 209, apical segment of aedeagus; 210, paramere; 211, ♀ genital segment, lateral view. 212, 213, *T. nestasimara*; 212, apical segment of aedeagus; 213, paramere. 214, 215, *T. camerounensis*; 214, apical segment of aedeagus; 215, paramere (slightly anterior view).



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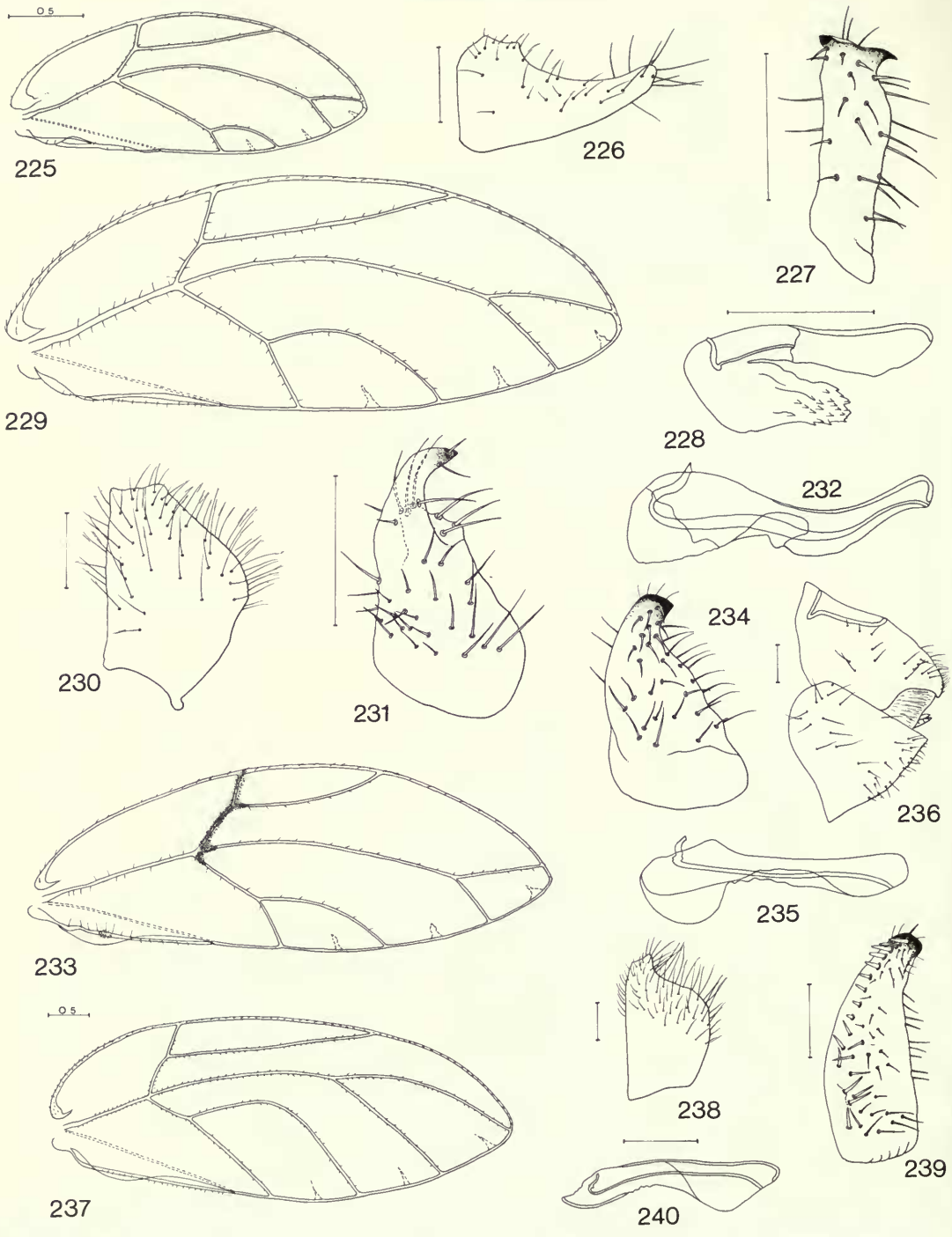

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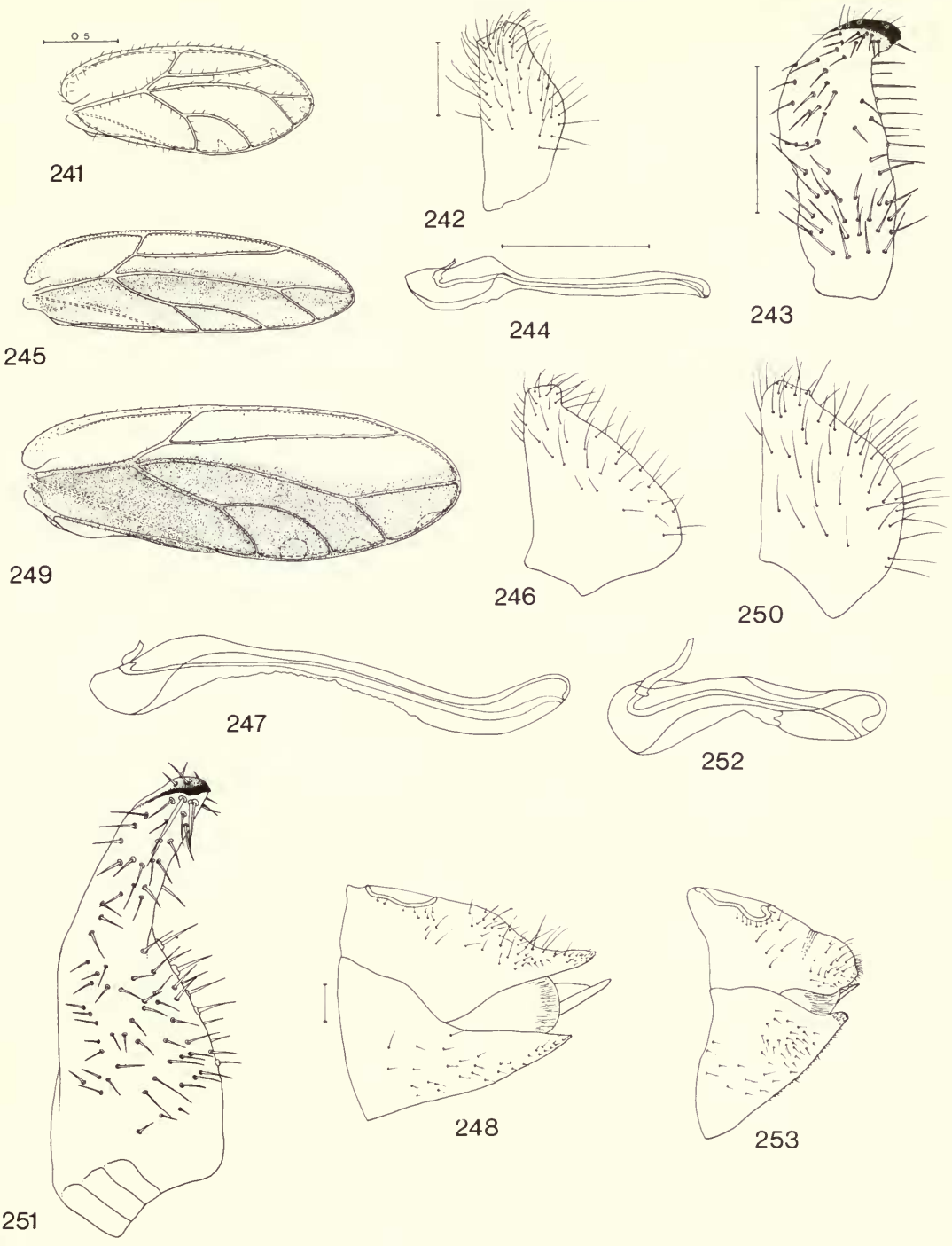

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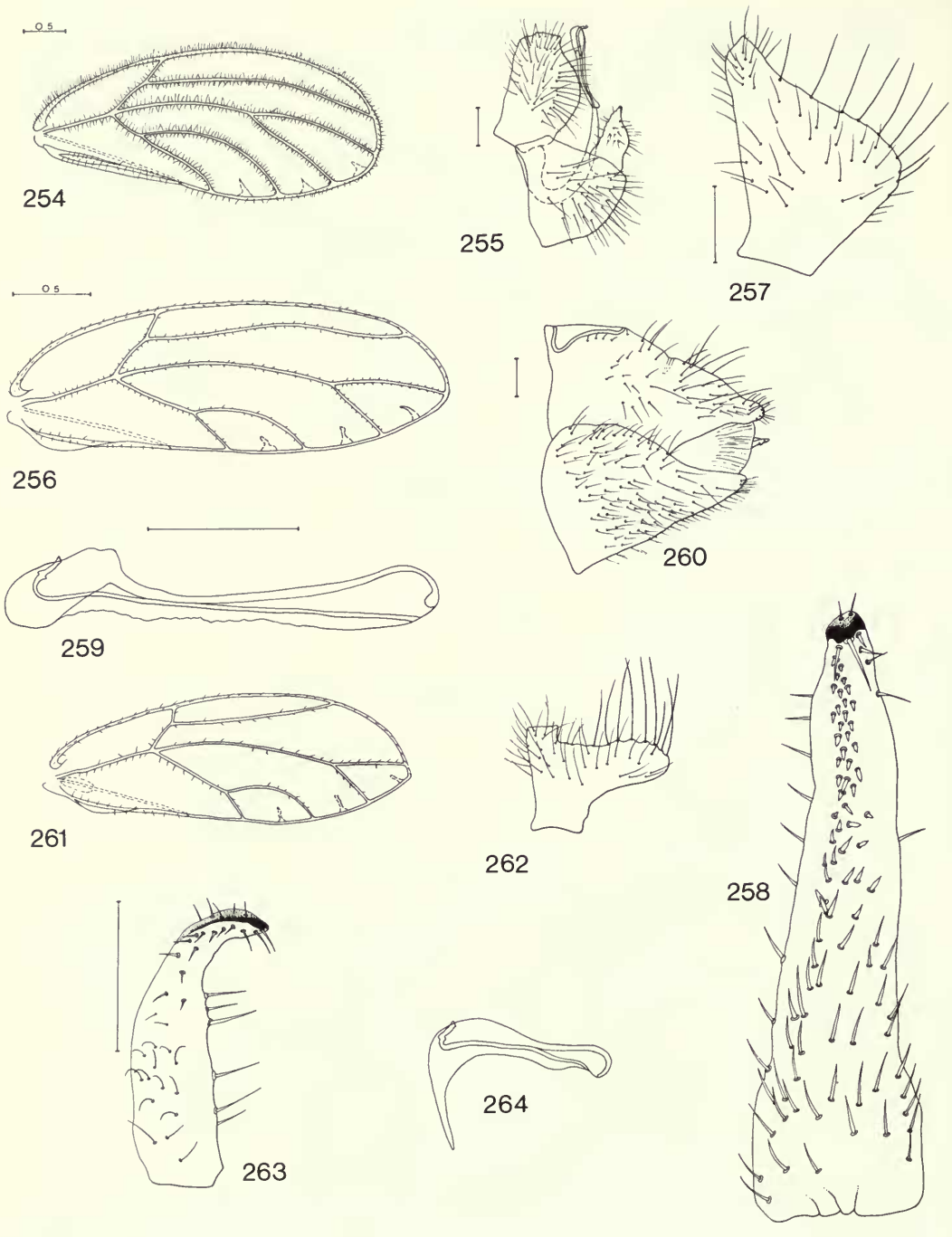

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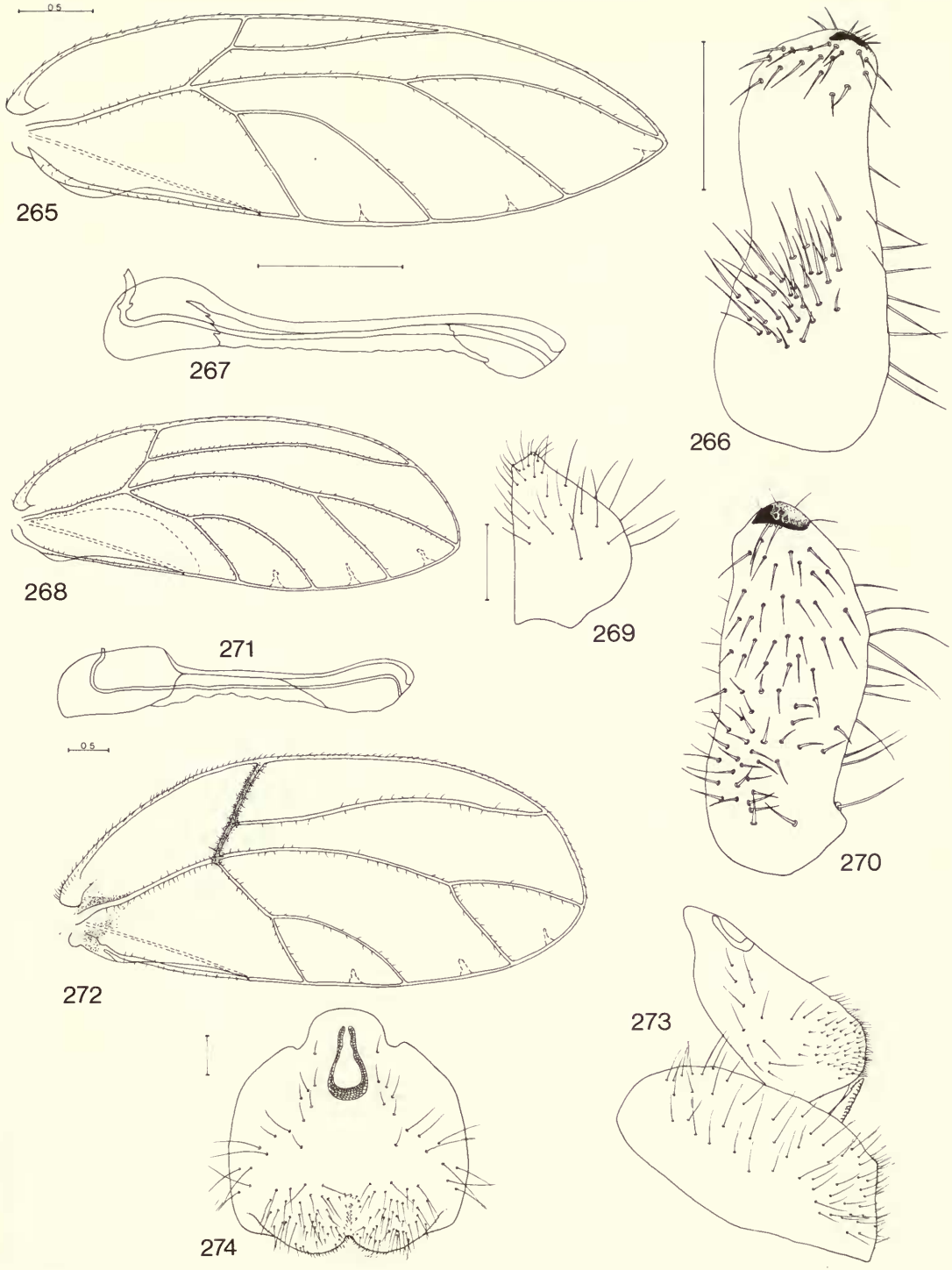

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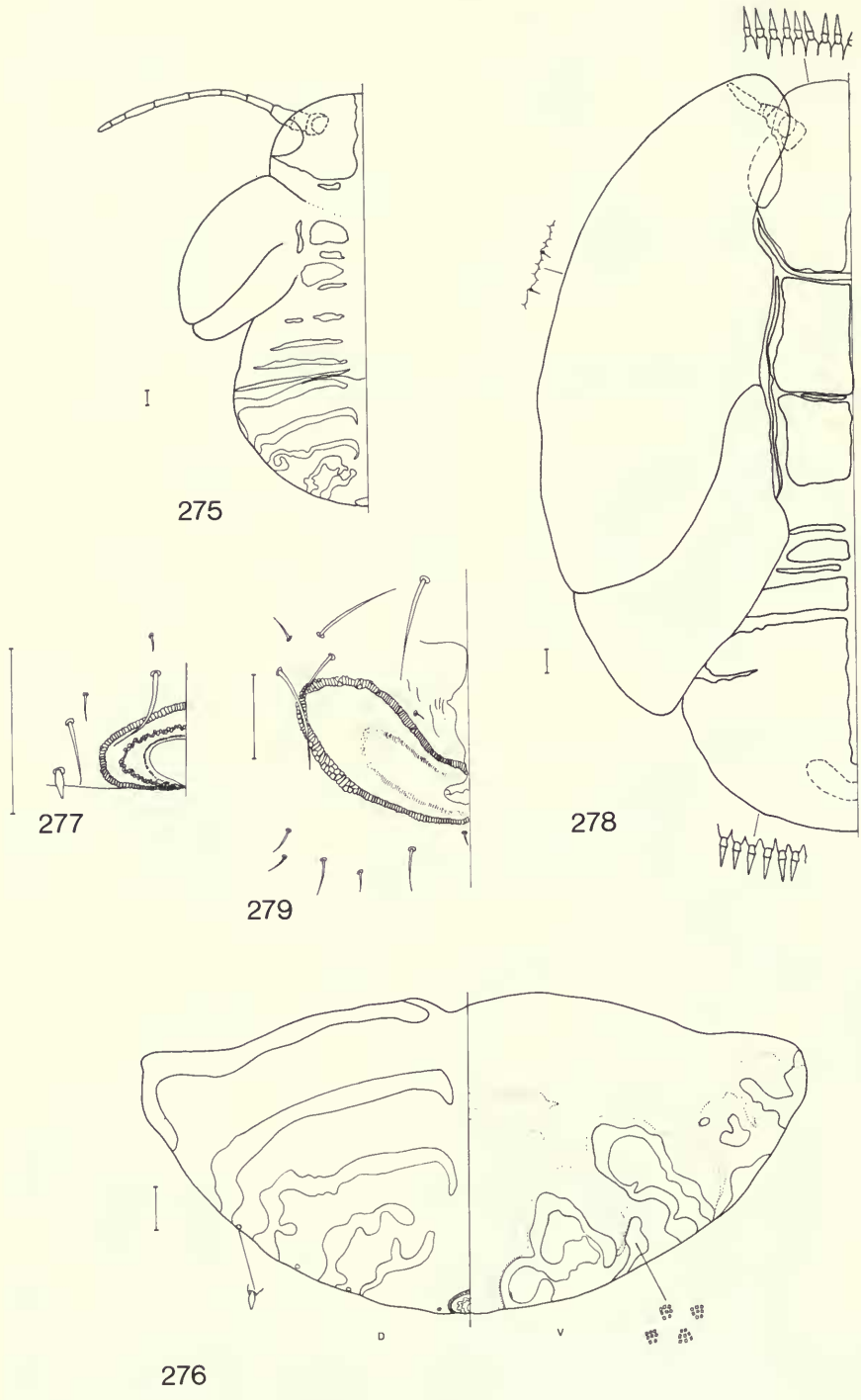

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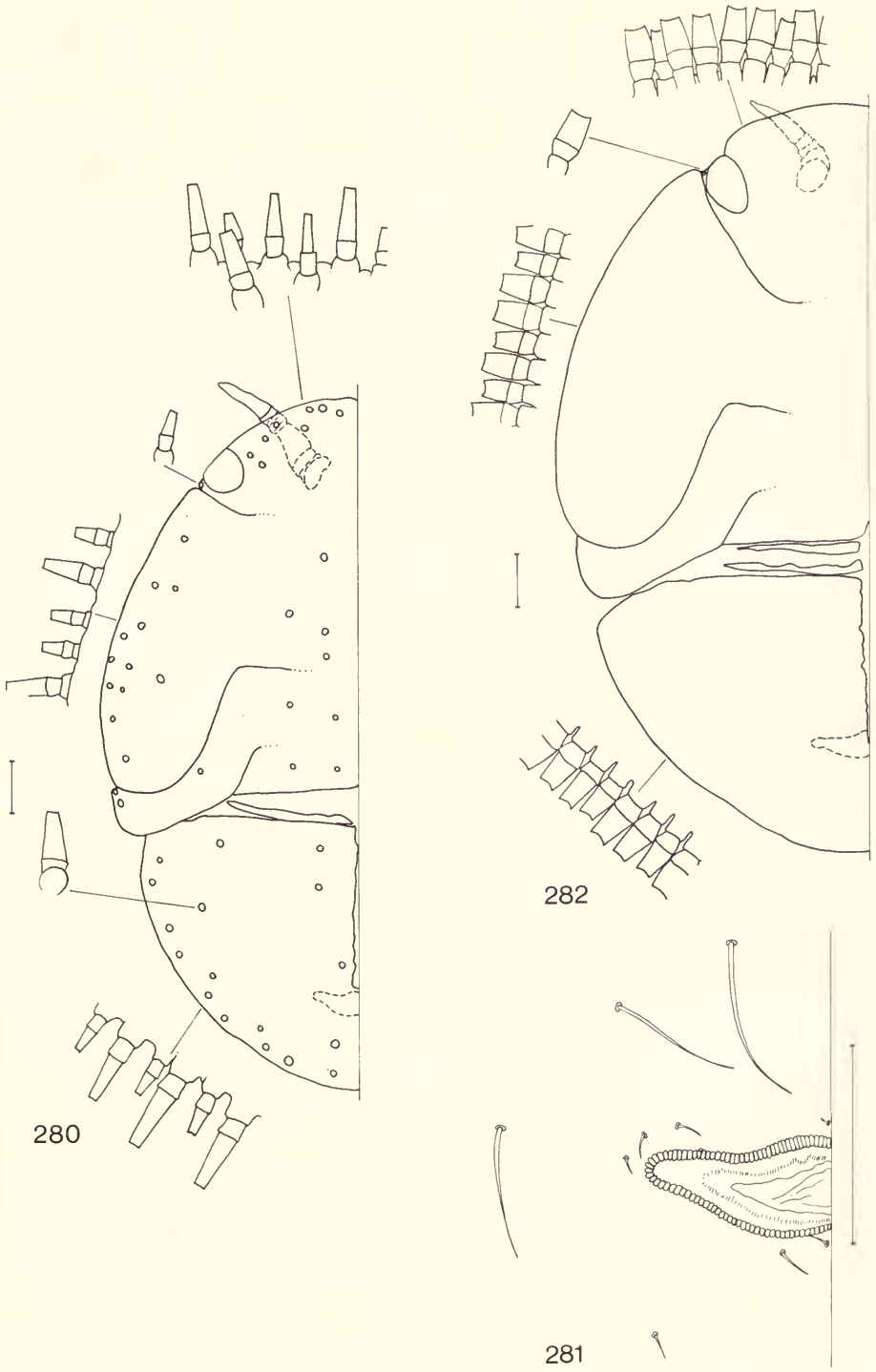

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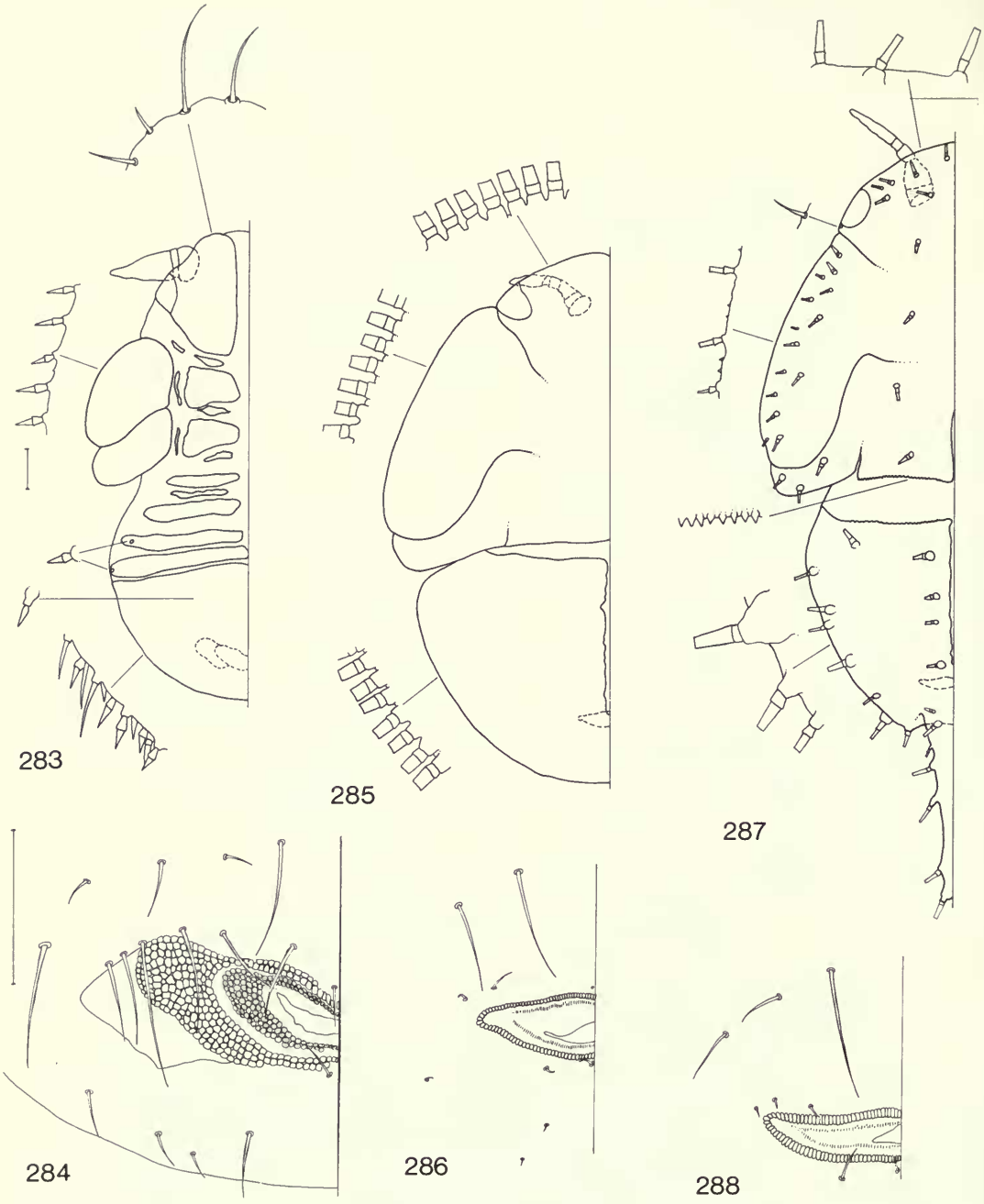

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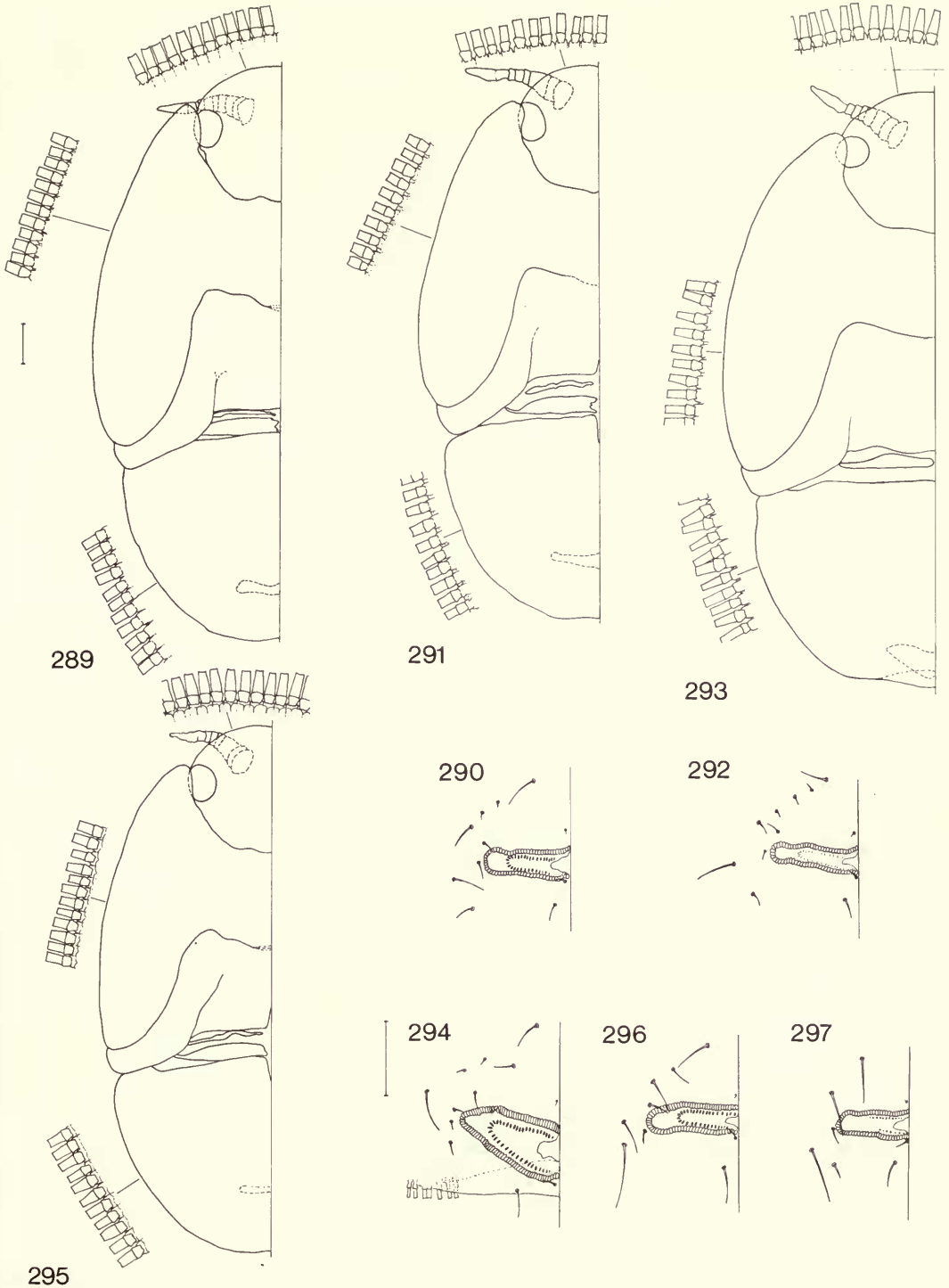

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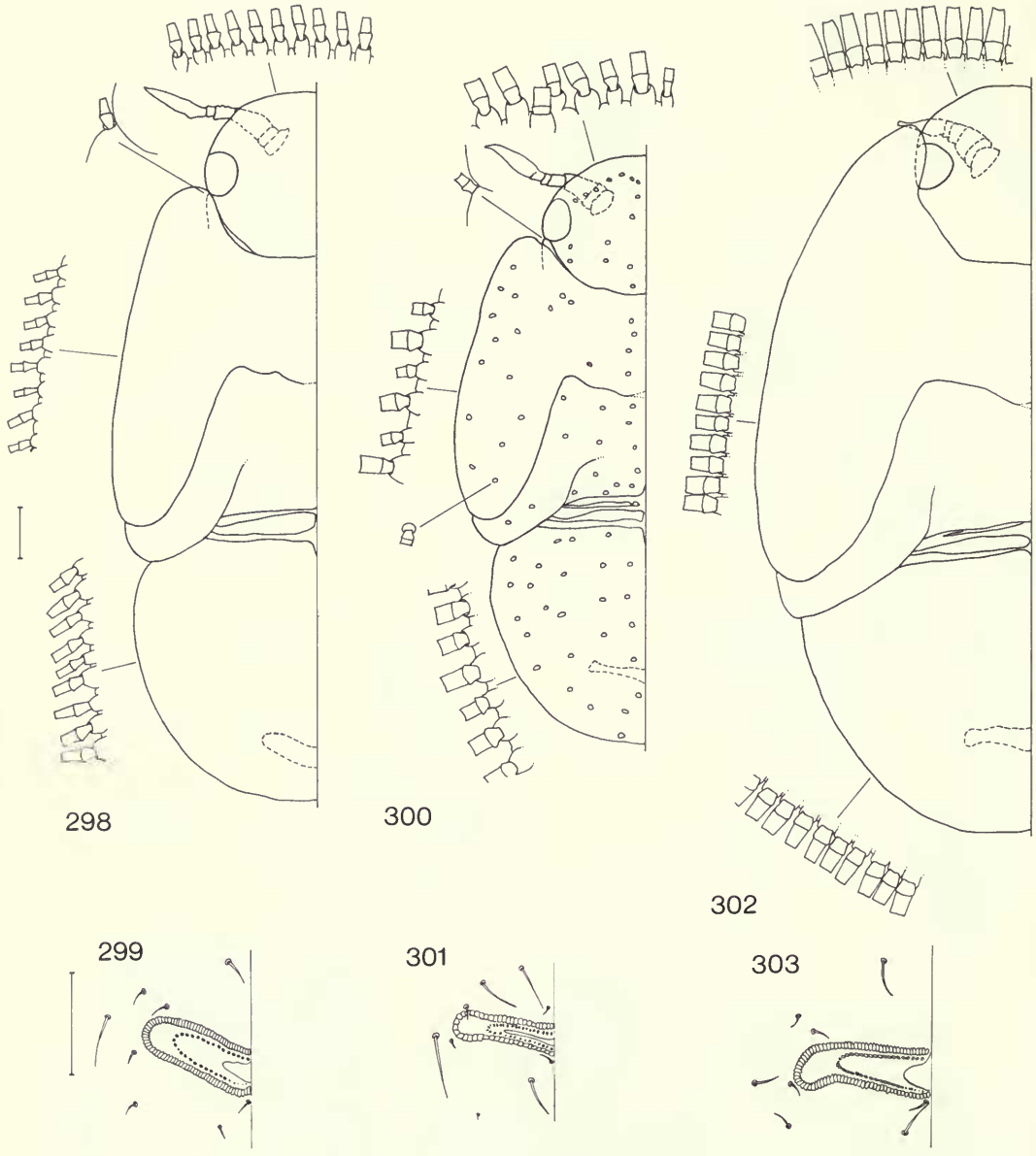

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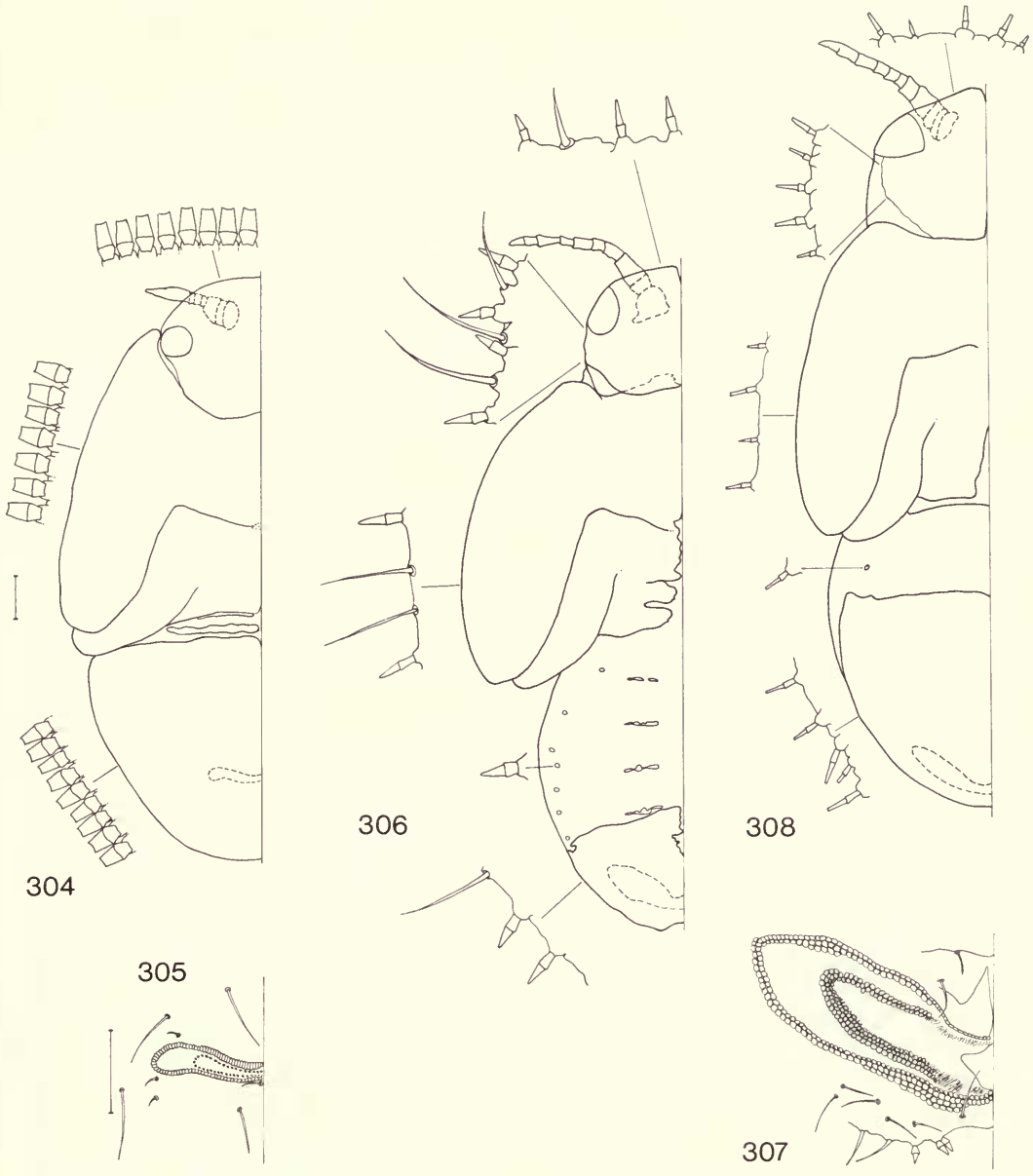

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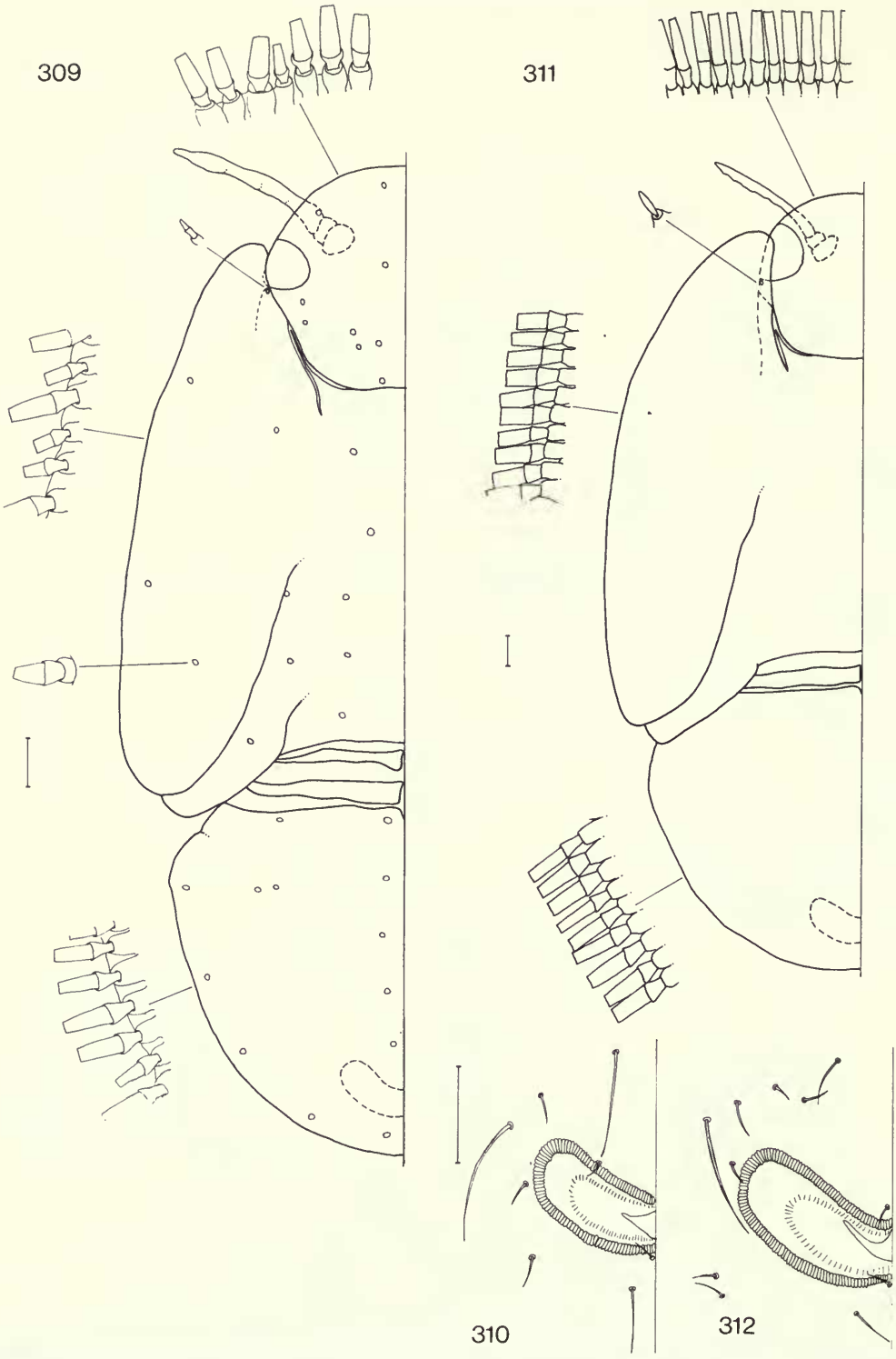

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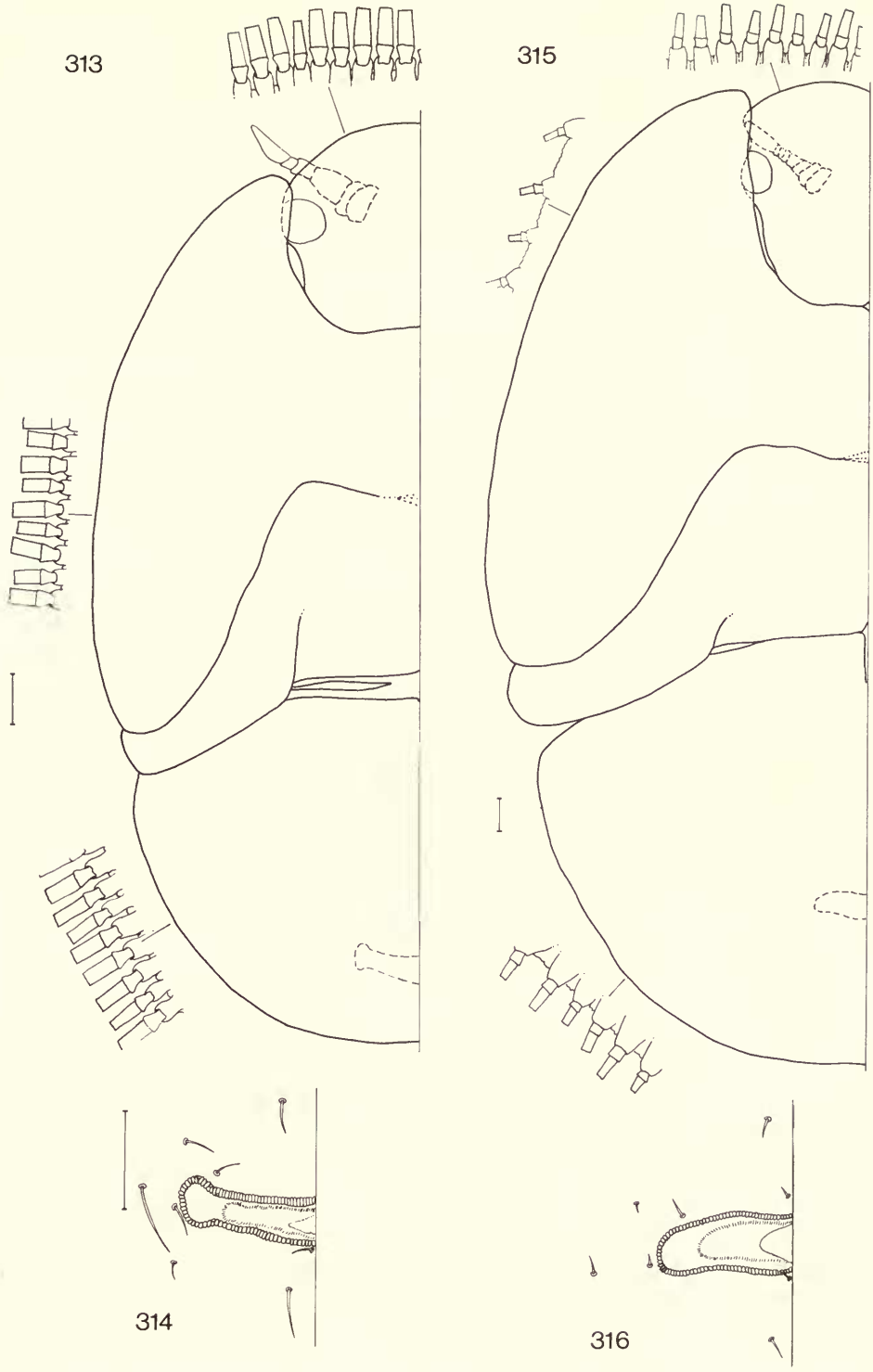

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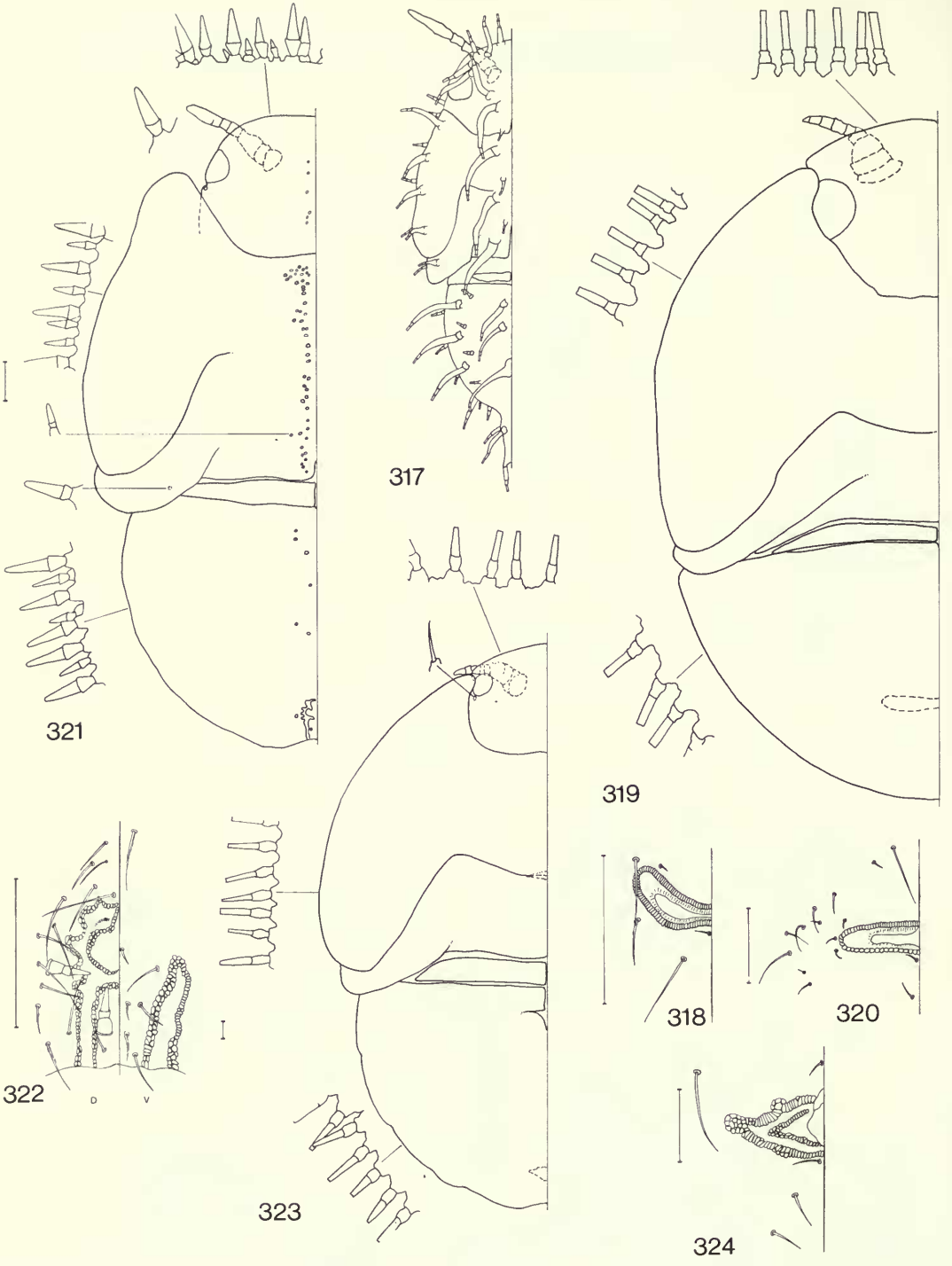

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